# MACHINERY

MAY 10, 1961 ONE SHILLING & THREEPENCE

DETROIT PUBLIC LIBRARY
JUN 2 1961
TECHNOLOGY DEPARTMENT

SKF

for the right bearing
in the right place . . .

THE SKEFKO BALL BEARING COMPANY LIMITED · LUTON · BEDS

THE ONLY BRITISH MANUFACTURERS OF ALL FOUR BASIC BEARING TYPES:
BALL, CYLINDRICAL ROLLER, TAPER ROLLER AND SPHERICAL ROLLER

The New 'Speetol' SUPER UNI-CAM CLAMP
REGD. TRADE MARK (PATENT PENDING)

COMBINED SCREW AND CAM ACTION

Completely Universal

Clamping is carried out instantly at any relative position to the clamping strap to suit the operator. Clamping is just as effective with the handle to the rear, to the front, or at any other position.

1 Illustration alongside shows set-up for a milling operation. Clamp handle is depressed to clamp down the work.

2 Operator pushes handle to rotate the cam unit for final screw clamping to increase pressure.

3 Easily detachable handle is being removed, leaving job firmly clamped and allowing cutters to pass over work.

FULL LITERATURE SUPPLIED

Speed Tools Ltd
VEREKER HOUSE, GRESSE ST., LONDON W.1. Museum 1039/1099.

NRP 9077

PRECISION TOOLING
From Drawing Office to Finished Product

JIGS & FIXTURES
SPECIAL PURPOSE MACHINES
GAUGES—MOULDS
PRESS TOOLS
AUTOMATION MACHINERY

Send your enquiries to:—

Leytonstone
JIG & TOOL CO. LTD.
LEYTOOL WORKS, HIGH RD., LEYTON, LONDON E.10.
Telephone: LEYtonstone 3022-3-4

TOOL MAKERS GAUGE & ASSOCIATION

Ma

# "These Wild-Barfield furnaces do a really good job"

Where heat-treatment is concerned—are you doing the job as economically as possible? It's surprising the number of people who invest in expensive machine tools for production—and then spoil a good job in outdated furnaces. And the result? Rejects—time, money and probably customer goodwill lost. More and more people are relying on Wild-Barfield equipment. Write for full details and see how you can save by changing to modern electric furnaces.

*Self-contained Electrode Salt Bath ESB 346.*
*Standard Model delivery ex stocks*

WILD BARFIELD

*ELECTRIC FURNACES*
*FOR ALL HEAT TREATMENT PURPOSES*

**Backed by 40 years specialist experience**

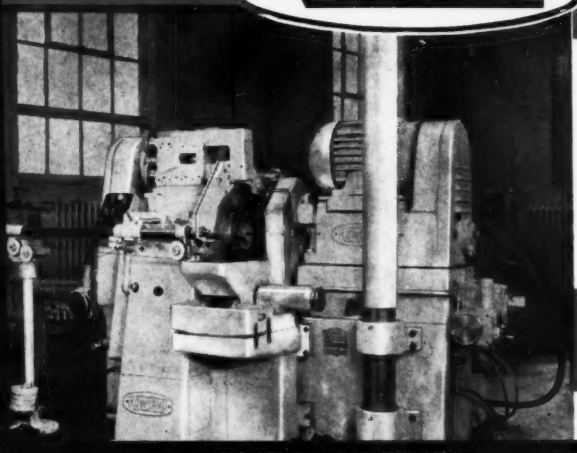
**WILD-BARFIELD ELECTRIC FURNACES LIMITED**

ELECFURN WORKS, OTTERSPOOL WAY, WATFORD BY-PASS, WATFORD, HERTS. Tel: Watford 26091 (8 lines) Grams: Elecfurn, Watford

WB71

*finest..fastest production machines of their typ*

DUPLEX **ROWLAND** SURFACE GRINDERS



***FINISHES BOTH SIDES SIMULTANEOUSLY***

***. . . . CUTS COSTS IN HALF***

This machine, recently installed in the works of Spirax-Sarco Ltd., is seen simultaneonsly grinding both faces of small circular components to exceptionally fine limits at extremely high rates of production.

**F.E.ROWLAND & CO.LTD.**

***PHONE: HEATON MOOR 3201/2/3***
***GRAMS: HEROIC REDDISH***

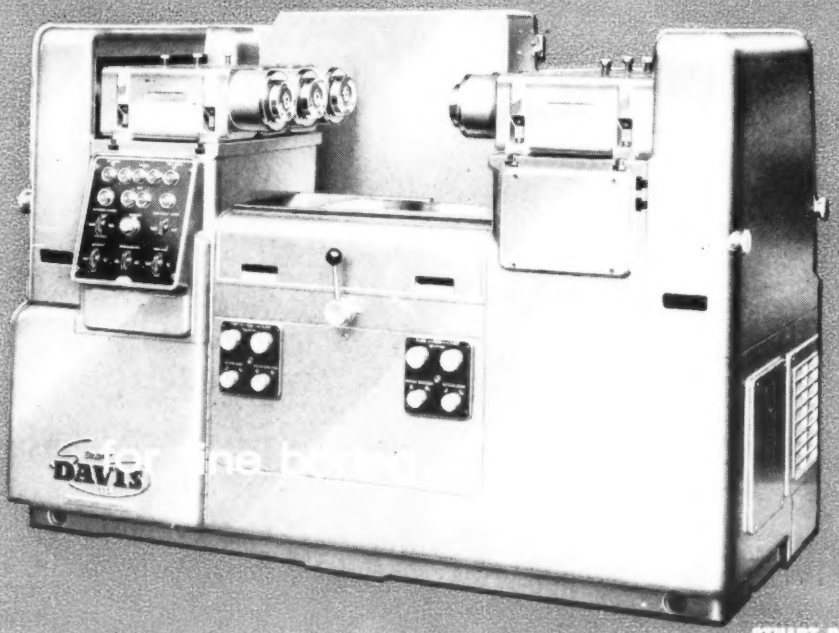
***CLIMAX WORKS, REDDISH, Near STOCKPORT***

typ
ERS
LY
HALF
n the
seen
es of
onally
es of
3201/2/3
ISH
XPORT

# BRITISH AND BEST BORERS BY STUART DAVIS

A range of single and double end fine borers; universal production tools of outstanding versatility unmatched for speed and economy.

FINE BORING MACHINES




**EXCLUSIVE FEATURES**

**Absolute reliability from a unique combination of hydraulic and electrical controls eliminating frustrating downtime. Ability to commence production at the first switch on — no waiting for oil temperatures to rise. Exclusive design of valve spools and hydraulic circuit eliminates spongy and varying feed rates. Complete hydraulic gear and electrical gear separate from machine is easily maintained.**

Stuart DAVIS LTD

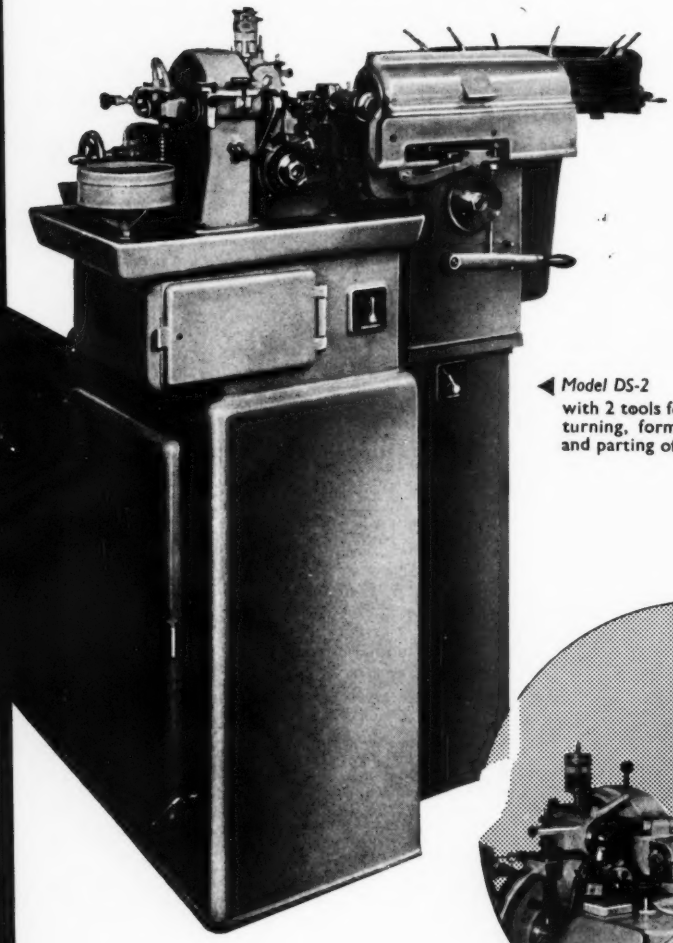
STUART DAVIS LTD., STONEBRIDGE HIGHWAY, COVENTRY, ENGLAND.

# ESCOMATIC

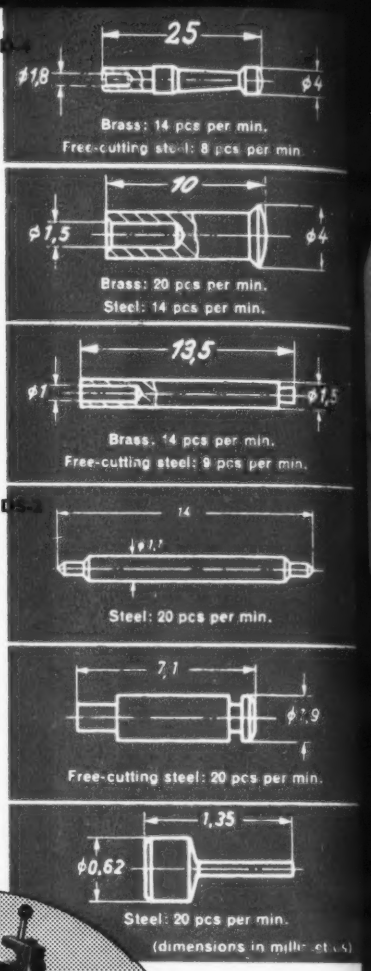
*Model DS-2 and D-4 Coil-Fed Automatics*

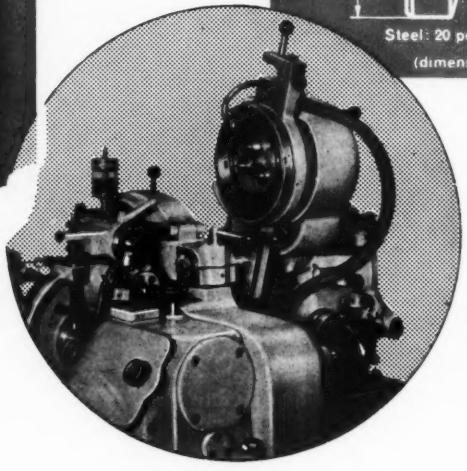
for greater efficiency in the production of small turned parts up to $\frac{5}{32}$in. dia., through

- CONTINUOUS FEED of material
- Burr-free cutting off
- Separation of finished pieces from swarf



◀ *Model DS-2* with 2 tools for turning, forming and parting off.



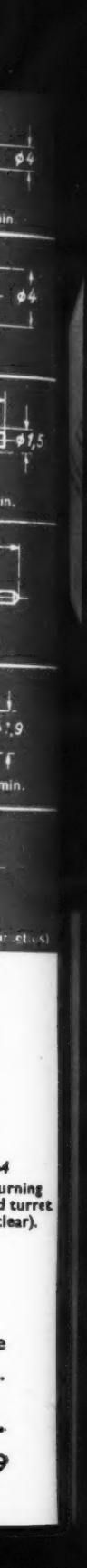



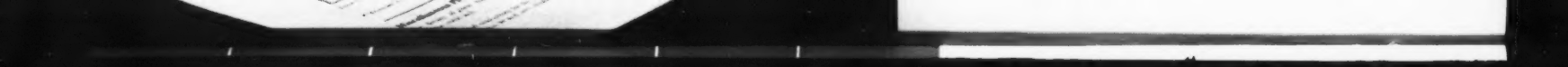
◀ *Model D-4* with 2 turning tools and turret (swung clear).

The turret of Model D-4 carries 3 spindles for centring, drilling, and collet clamping, so that the advantages of the ESCOMATIC method are now available for parts with centres and short holes.

**HAHN & KOLB (Great Britain) LTD.**

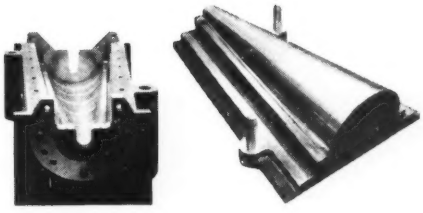
243-245 Horn Lane, ACTON, LONDON, W.3 Tel.: Acorn 8938/9





# Save on time and cost of cold and hot forming operations by using HARPER 'CAST-TO-FORM' TOOLS

If you are forming metals, plastics, rubber, glass fibre or asbestos compounds you can save time and money. Harper 'cast-to-form' tools need minimum finishing before putting into service and first quality materials ensure long life. We can offer exceptionally good delivery.



Showing the high finish obtainable on polished tools used for production of six-feet long asbestos components.

*Fully descriptive technical leaflet T.3 on request from:*

**JOHN HARPER & CO. LTD., WILLENHALL, STAFFS.**

**WILLENHALL 124 (5 lines) · FOUNDED 1790 · LONDON: ABBey 5906 7**
**MANCHESTER: BLAckfriars 0295 · POOLE FOUNDRY LTD: POOLE 212**
**Makers of the famous Beatrice Oil Heaters and Harper Housewares**

H 681

# Have YOU tried a SpacesaVer drive?

This SpacesaVer wedge-belt drive transmits 25 h.p.—in the space of three fingers!

Look how SpacesaVer Wedge-belt Drives are already proving their worth.
Scottish Agricultural Industries Ltd. of Glasgow were recently faced with an unusually difficult problem. An air blower, directly-driven by a 25 h.p. motor, had to be stepped up in speed from 1480 to 1660 r.p.m., but the shaft extension was only 2¼in. Even so, a SpacesaVer drive of 25 h.p. capacity could be mounted. SpacesaVer pulleys 9 in. and 8in. diameter (face width 2.73, boss length 1⅛in.) and three No. 710 Beta-section belts did the trick. In fact, as the works' engineers then commented, "SpacesaVer is the complete answer . . ."

SpacesaVer

BETTER THAN BELTS • COMPACT AS CHAIN • GENTLER THAN GEARING

*MADE ONLY BY:* *Are you using SpacesaVer drive catalogue 135/20 yet?*

**J • H • FENNER & CO • LTD • HULL**

**LARGEST MAKERS OF V-BELT DRIVES IN THE COMMONWEALTH**

***FACTORIES OVERSEAS IN AUSTRALIA, INDIA AND SOUTH AFRICA***

*When answering advertisements kindly mention MACHINERY.*

1961

?

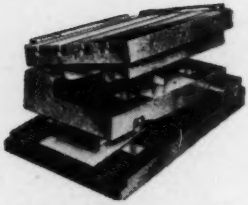
NG

# This bit is big news
## —from any point of view

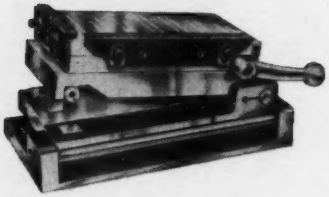
**There are sound reasons for using "Super Capital" High Speed Steel Toolbits. The high quality steel is production controlled and tested, in Balfour's own works, from the melt to the finished product. Toolbits are subjected to a specialised heat treatment to ensure extra life and durability. They satisfy the needs of users who require maximum performance at no extra cost. These qualities ensure that a change to "Super Capital" is a change for the best.** *Available in Sheffield, and also from branch office stocks in London, Birmingham, Manchester, Cardiff and Glasgow.*

**ARTHUR BALFOUR**

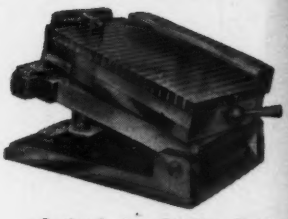
**ARTHUR BALFOUR & CO, LTD. CAPITAL STEEL WORKS, SHEFFIELD ENGLAND.**



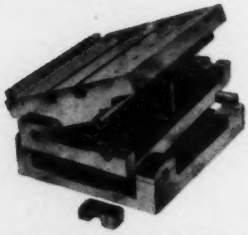
Compound Sine Table with 'T' Slotted Face: 12in. by 8in.



Compound Sine Table with Non-Electric Magnetic Face: 10in. by 5in.



Produced for Grinding Turbine Blades. Tilting and Swivelling with 14in. by 8in. Non-Electric Magnetic Chuck.



Special for Aircraft Industry. Completely Universal: 12in. by 10in.

# A SELECTION OF COMPOSINE SINE TABLES

FROM THE COMPREHENSIVE WINDLEY

CROWN

RANGE

Centres for most standard types can be supplied at extra cost.

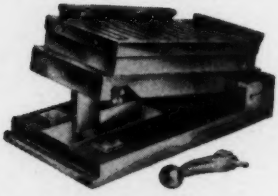
Manufactured in England by

## WINDLEY BROS

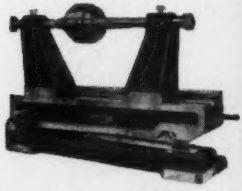
LIMITED

Write for fully illustrated brochure and prices of these and other Crown products

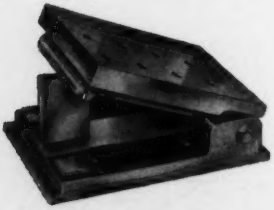
Special Compound with Super Accurate Scales and Optical Projection Micrometers.



Simple Angle Sine Table with Non-Electric Magnetic Face: 10in. by 5in.

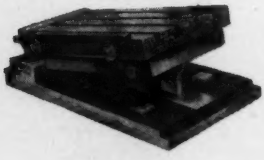


Sine Centres, with or without extended base, surfaced parallel to the centre axis when at rest.

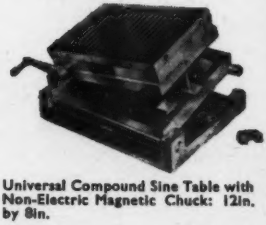


Simple Angle Sine Table with Tapped Holes for Clamping: 6in. by 4in.

Universal Compound Sine Table with 'T' Slotted Face: 11in. by 7in.



Simple Angle Sine Table with 'T' Slotted Face: 12in. by 8in.



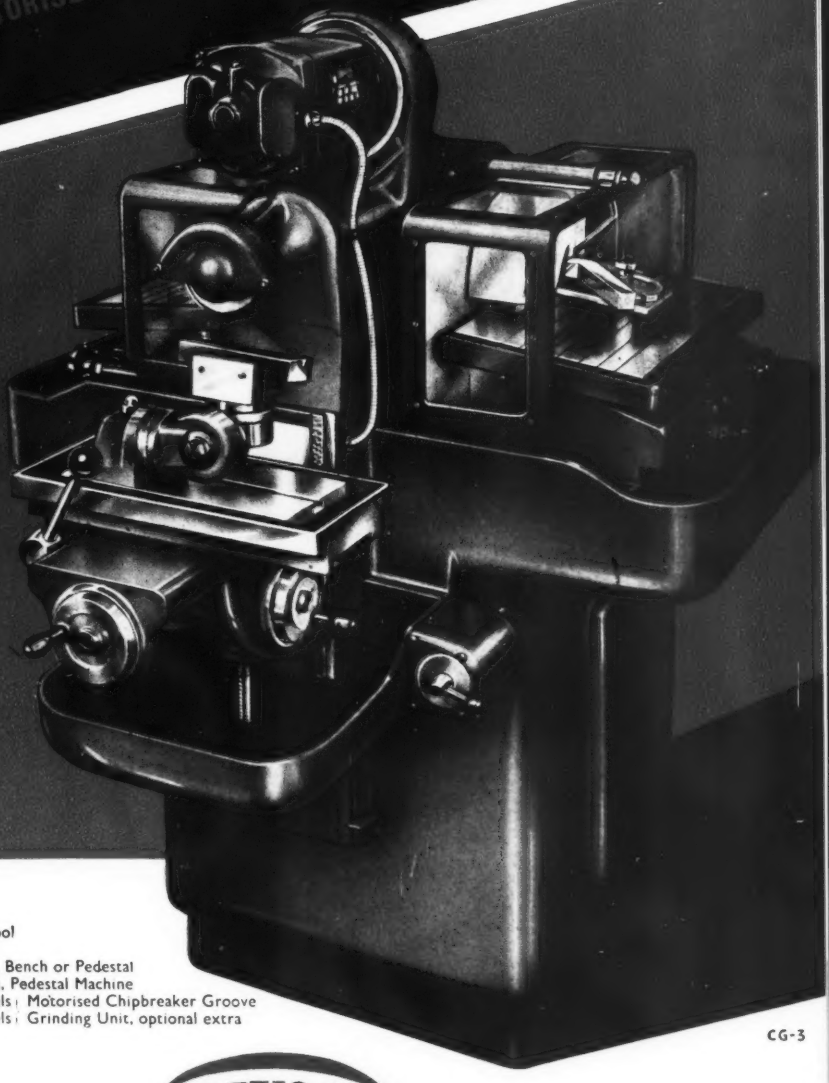
Universal Compound Sine Table with Non-Electric Magnetic Chuck: 12in. by 8in.

**CROWN WORKS · LONDON RD · CHELMSFORD · ESSEX · Chelmsford 2224**

# ABWOOD 'CONCENTRE' CARBIDE TOOL GRINDER

## Model CG2A

WITH MOTORISED CHIP-BREAKER GROOVE GRINDING UNIT



- Constant centre height of table to grinding point irrespective of angle
- Adjustable taper roller bearings eliminate end float
- Perspex panelled spray guards provide perfect vision, hinged for easy access to wheel
- Uses diamond wheels to their maximum efficiency
- The Chipbreaker Groove Grinding Unit accommodates turning tools of most shapes and sizes

Our full range of Carbide Tool Grinding Machines includes:
**Model CGO,** 6 in. Wheels, Bench or Pedestal
**Model CG1A,** 8 in. Wheels, Pedestal Machine
**Model CG2A,** 8 in. Wheels, Motorised Chipbreaker Groove
**Model CG3A,** 12 in. Wheels, Grinding Unit, optional extra

CG-3

**ABWOOD MACHINE TOOLS LTD., PRINCES ROAD, DARTFORD, KENT**

**Telephone : DARTFORD 25271 (5 lines)** **Telegrams : ABWOOD, DARTFORD**

*Low cost automation*

# 'CENTEC AUTOMIL'

*suitable for*

## PENDULUM MILLING

USING TWO FIXTURES

**14 inch TRAVERSE**

**WITH HYDRO PNEUMATIC TABLE DRIVE**

★ Automatic Cycle Production Milling

★ Climb Milling

★ Pendulum Milling

★ **SEPARATELY CONTROLLED FEED RATES IN EACH DIRECTION 2in.-400in. PER MINUTE**

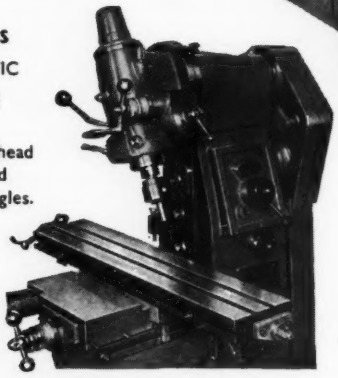
★ Fast Traverse Rate: 420in. per Minute

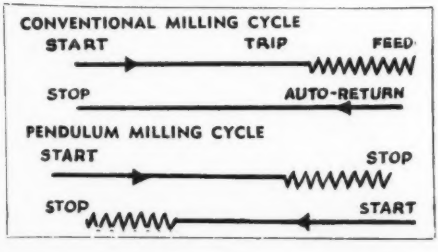
★ High Rigidity

Table surface **27**ins. x **6**ins.

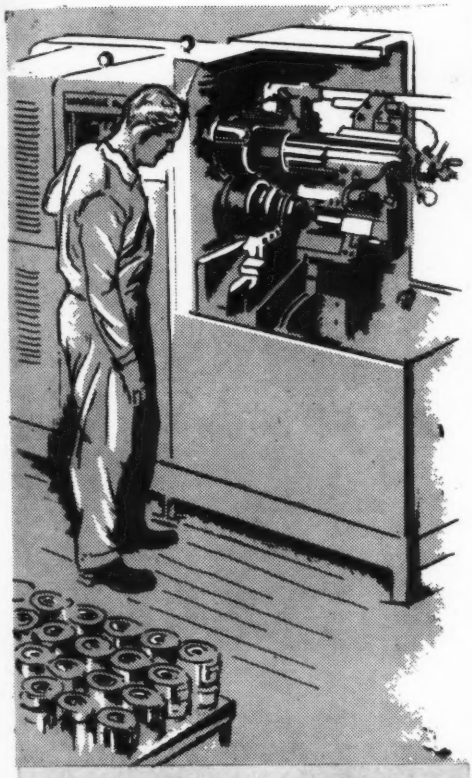
***Works on standard air line pressure***

**OPTIONAL EXTRAS**
AUTO-PNEUMATIC
INDEX TABLE
also
Vertical swivelling head for MILLING and DRILLING at all angles.






**Full Details:**
**CENTEC MACHINE TOOLS LTD., Centec Works**
**Hemel Hempstead, Herts.** Boxmoor 584-5-6



# 2AC *Automatic*

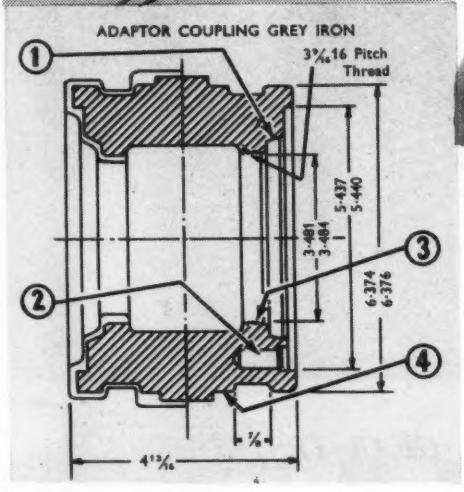
## for Versatile Production

This single spindle chucking automatic is more versatile than a hand-operated machine, it does more complicated work—automatically. You complete more jobs on the 2AC, fewer second operations are needed and standard tool and machine functions will handle most work.

Built-in rigidity and accuracy are features that ensure the holding of close tolerances and speeds and horsepower permit effective use of today's most advanced cutting tools. Because of their fast set-up features batchwork can be produced more profitably on an automatic basis. A 12" air operated chuck is fitted.

*The production example below demonstrates:-*

1. **Late Cross Slide** - a versatile machine function.
2. **Automatic Feed and Speed Changes** permit multiple drilling the four holes.
3. **Threading Ability** is shown.
4. **The Skip Feed** feature saves cycle time when turning radially interrupted diameters.



**British Built**

WARNER SWASEY ASQUITH

*Sales and Service for the British Isles*

**DRUMMOND - ASQUITH LIMITED**

*Member of the Asquith Machine Tool Corporation*

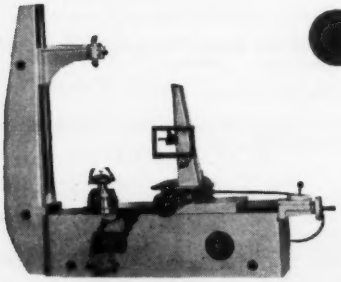
KING EDWARD HOUSE, NEW ST., BIRMINGHAM. *Phone: Midland 3431. Also at LONDON Phone: Trafalgar 7224 & GLASGOW Phone: Central 0922*

WSA 471

Goulder

# GEAR MEASURING EQUIPMENT

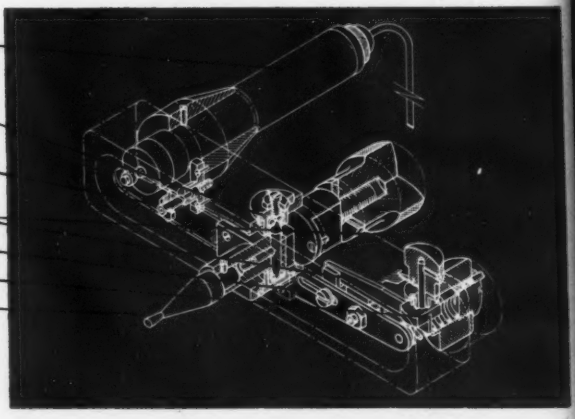
*This series of advertisements is intended to show how attention to detail design backed by careful and precise manufacture has made Goulder gear measuring equipment first choice of buyers who appreciate these qualities.*



## INVOLUTE TESTER INDICATING HEAD

used on Goulder Nos. 1, 2 and 3 Involute Testers to measure deviation of profile from true involute.

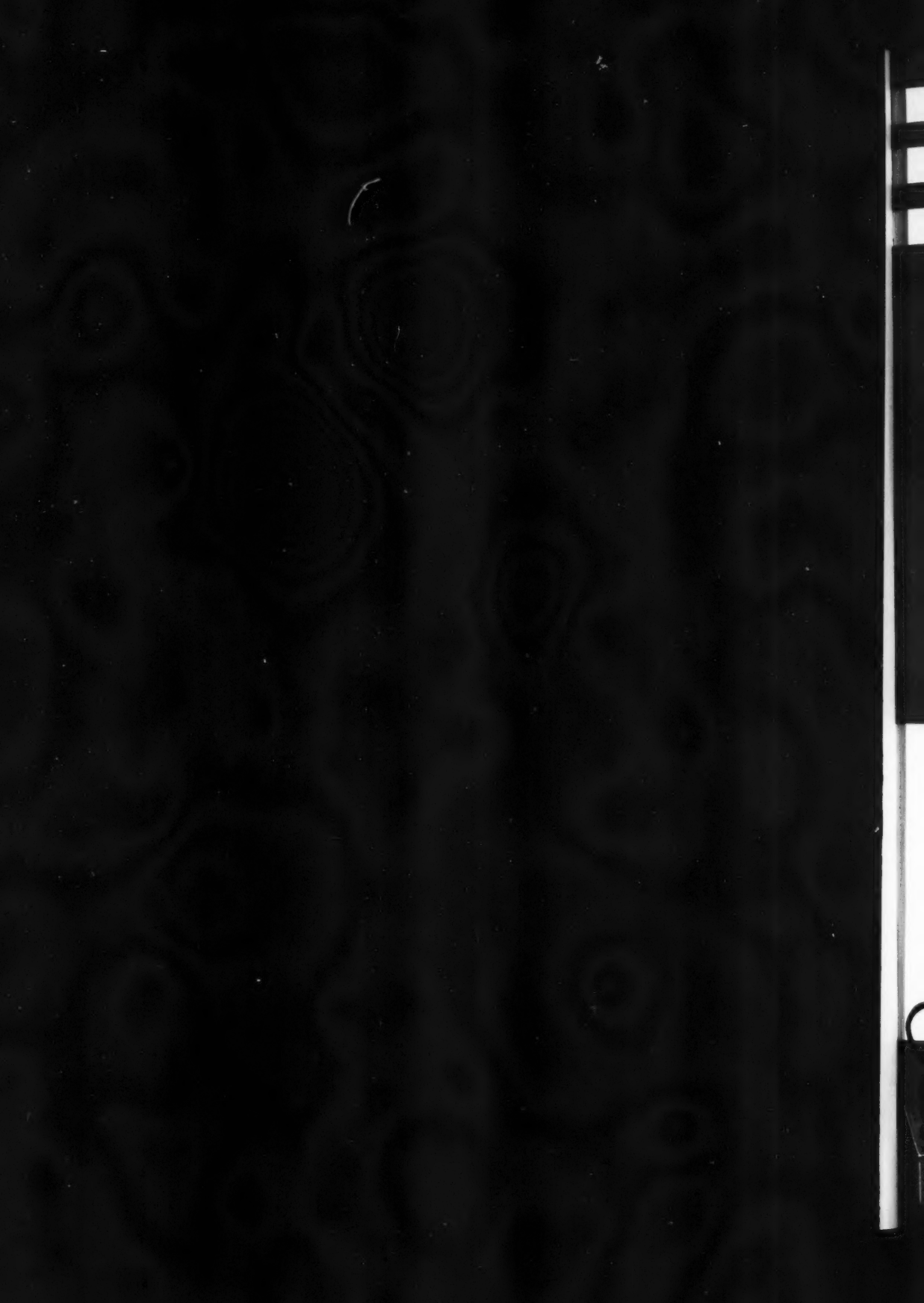
- ELECTRONIC RECORDING USING AXIAL GAUGE HEAD WHICH CAN BE USED ON OTHER INSTRUMENTS WHEN REQUIRED
- PIVOT BEARINGS FOR SENSITIVITY AND ACCURACY
- PROTECTION AND EASE OF OPERATION THROUGH TRAVEL LIMITING DEVICE
- BUILT IN BIASSING THROUGH LEAF SPRING
- SIMPLE MEASURING PRESSURE ADJUSTMENT
- ADJUSTABLE BALANCE SPRING
- INTERCHANGEABLE STYLUS
- UNIT CONSTRUCTION FOR EASE OF MAINTENANCE
- ROBUST AND DUSTPROOF ASSEMBLY



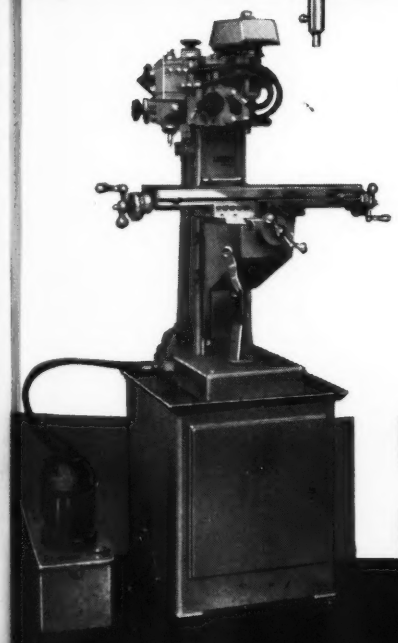
Goulder *THE NAME FOR ALL GEAR TESTING*

**J. Goulder & Sons Ltd.,** KIRKHEATON, HUDDERSFIELD. *Tel: Huddersfield 5252-3*

15-18



# SPECIALLY FOR VERTICAL MILLERS - NEW HEPWORTH HYDRAULIC COPYING ATTACHMENT - FITS MOST TYPES - EXTREMELY ACCURATE - LOW PRICE



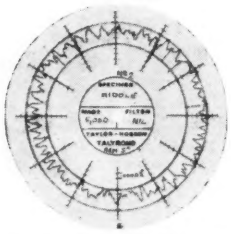
- Can be fitted in approximately fifteen minutes.
- Can be removed for normal machining.
- Does not impede the normal use of the machine in any way.
- Light stylus pressure.
- Adapted to any quill type machine.
- Suitable for all types of die sinking work.
- Can be fitted to both new and old machines.
- Unequalled accuracy.
- Many users claim ±.001in. accuracy.
- No additional parts required. Price includes pump unit, pipes, etc.

**Type 600 D.S.....£310**
**Type 250 D.S.....£275**

## HEPWORTH
hydraulic copying equipment

**THE HEPWORTH IRON COMPANY (Engineering) LIMITED**
industrial hydraulic mechanisms
**Hazlehead Nr. Sheffield**
telephone Penistone 3342-3 telegrams Carlecotes Penistone

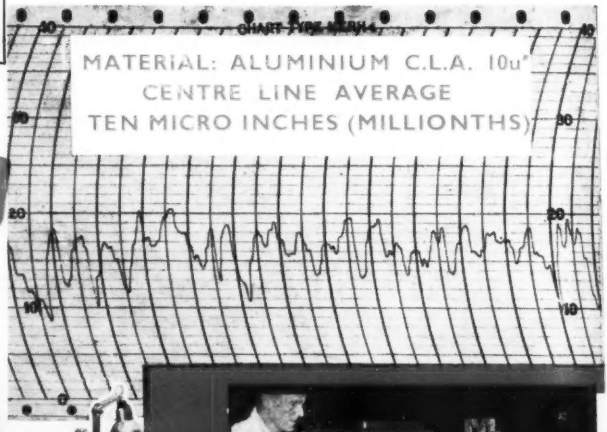
**ROUNDNESS LESS THAN A TENTH**
ACTUAL: $\frac{8}{100,000}$"

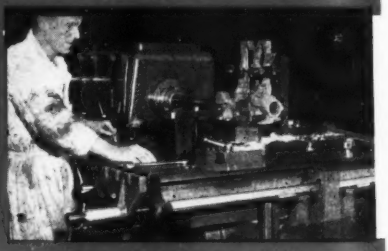


THANKS TO TIMKEN **"DOUBLE ZEROS"**

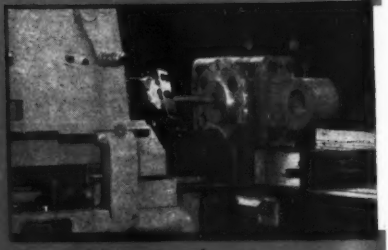
# ACCURACY plus FINISH

**the advantages of "fine boring" techniques** are now universally accepted by progressive firms. By running the cutting tool at its maximum cutting speed, time is saved, and accuracy and finish greatly improved. Hitherto such machines were limited to light cuts and fixed centre heights: this is no longer so. The Milnes Heavy duty boring machine has overcome these limitations, and has extended the application to a wide range of general engineering components either as one offs or batches of thousands. The machine is capable of roughing castings with cuts up to $\frac{1}{2}$in. deep, and spacing accurately any number of bores. It is robust, dependable and easy to operate, and can be profitably employed in all modern machine shops.





photograph by courtesy of
B. T. H. LTD. RUGBY



photograph by courtesy of
BAYLISS, JONES & BAYLISS LTD.,
WOLVERHAMPTON

devised and produced by

**Henry Milnes Ltd.,**
INGLEBY WKS., ROSSE ST., BRADFORD 8, YORKS.
TELEPHONE: BRADFORD 41301
*EST. 1858*

GEARS USED ON

ARMOURED FIGHTING VEHICLES

ARE MANUFACTURED

COMPLETE FOR

Leyland

Accuracy and dependability are important factors in the manufacture of gears for this important duty.

The photograph shows the Orcutt HK3 External Helical Gear Grinding Machine on the final profile grinding.

*Send us your enquiries.*

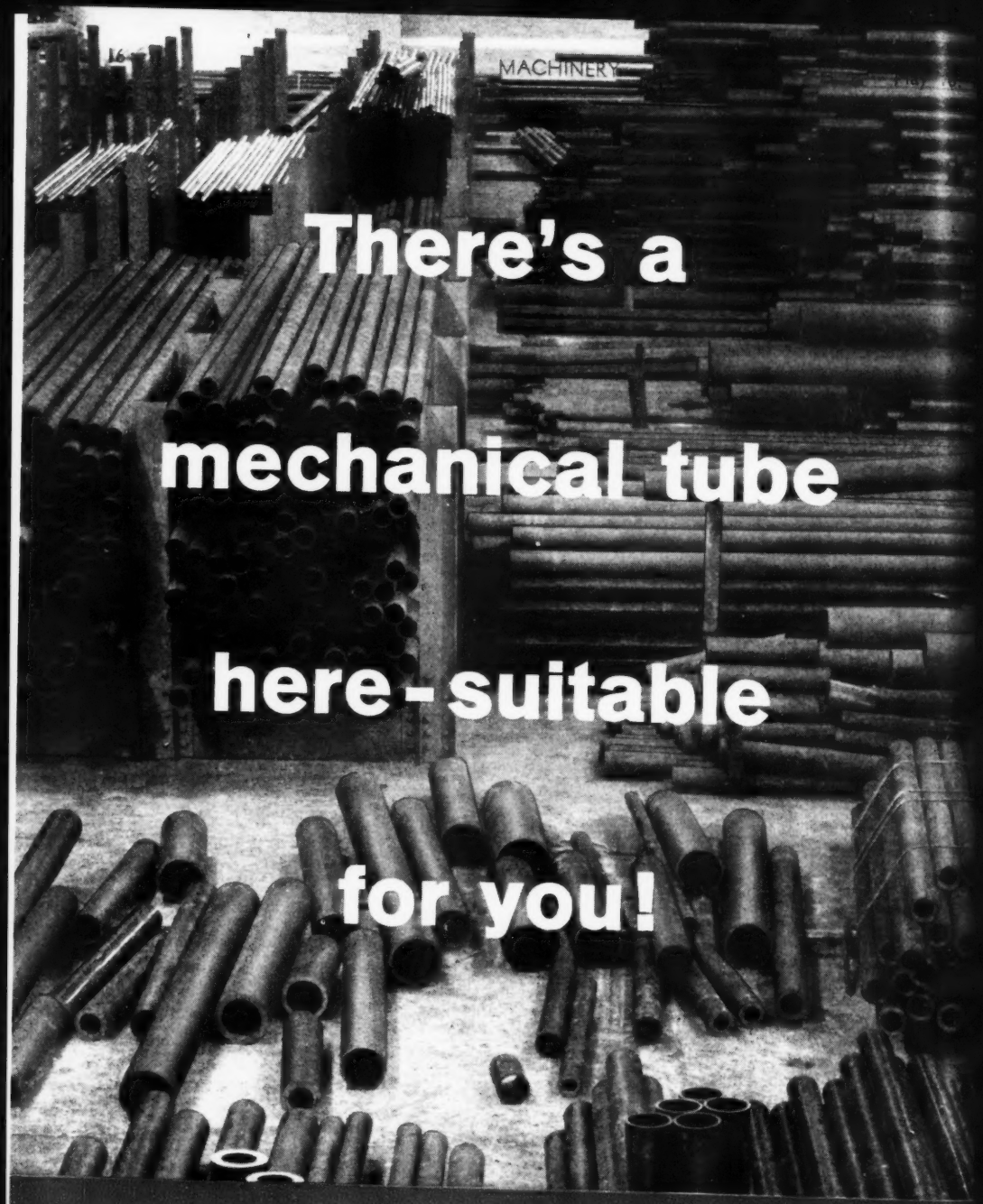
*Comprehensive Gear Grinding Service*
*Gears Manufactured and Ground Complete*
*Makers of The Orcutt Range of Gear and Spline Grinding Machines*

**The Gear Grinding Co. Ltd.**

**CRANMORE BOULEVARD - SHIRLEY - SOLIHULL - WARWICKSHIRE**

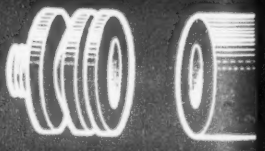
Telephone : SHIrley 2231 (6 lines)

Telegrams : Orcutt, Birmingham



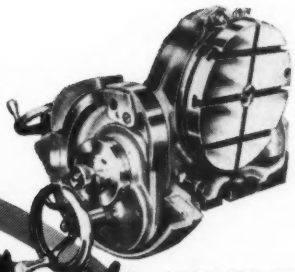

# There's a mechanical tube here - suitable for you!

We have mild steel and stainless tube in many sizes and large quantities.
We stock systematically and can send you a standard stocklist which shows sizes immediately available.
Tube can be supplied in cut lengths or randoms.
Thick-walled tube is a speciality.



**Markland Scowcroft** BROMLEY CROSS Nr. BOLTON

HAND OPERATED
PLAIN TYPES

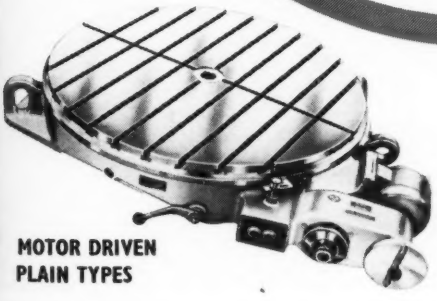


HAND OPERATED
TILTING TYPES

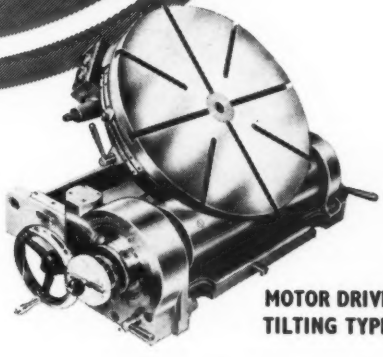
Pratt & Whitney

# PRECISION ROTARY TABLES

FIRST CHOICE FOR PRECISE
CIRCULAR SPACING AND
ANGULAR POSITIONING



MOTOR DRIVEN
PLAIN TYPES



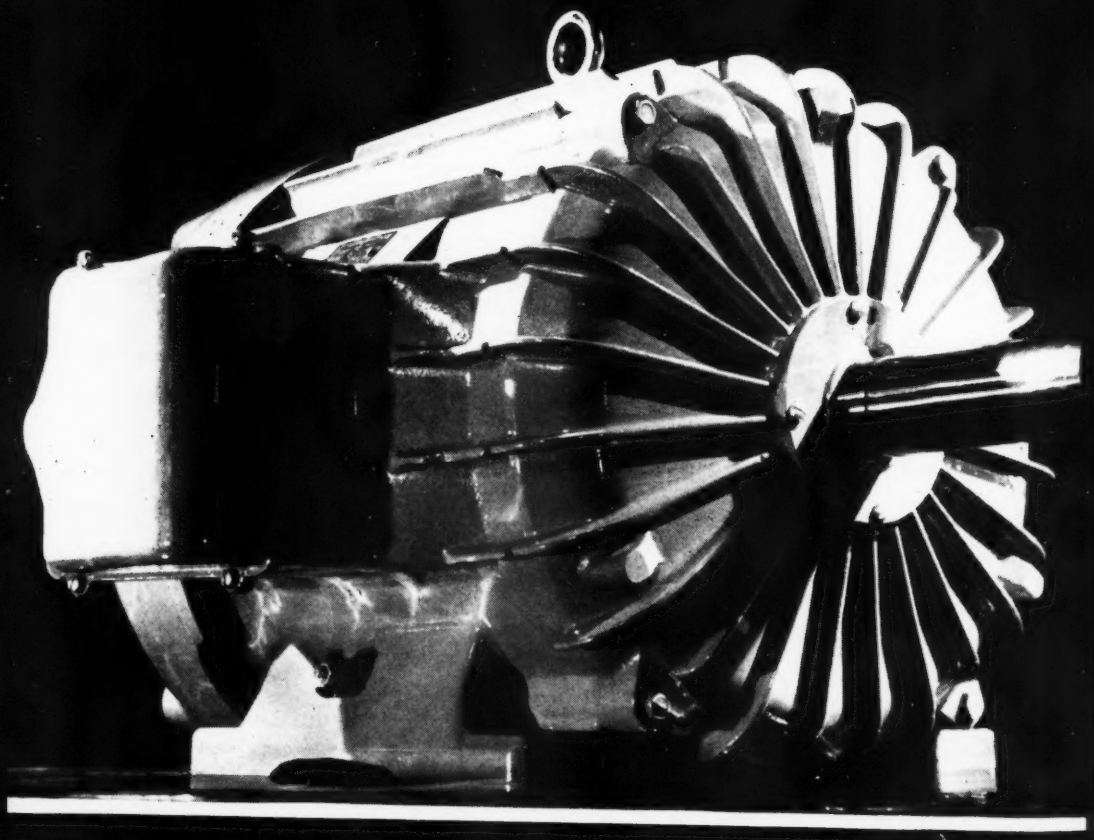
MOTOR DRIVEN
TILTING TYPES

**BUCK & HICKMAN LTD – OTTERSPOOL WAY – WATFORD BY-PASS – HERTS**

HEAD OFFICE
*P.O. BOX 74 WHITECHAPEL ROAD*
*LONDON, E.1.*

BRANCHES
*ALPERTON — BIRMINGHAM — BRISTOL*
*GLASGOW — LEEDS — MANCHESTER*

B



# The new Series 5 T.E.F.C. motors by Crompton Parkinson makes motors built to B.S.2083 obsolete for new applications

These totally-enclosed fan-cooled motors are made to the new British Standard dating from last November—B.S.2960: Part 2: 1960.

This Standard brings totally-enclosed fan-cooled motors into line with ventilated motors built to B.S.2960: Part 1, both dimensionally and in terms of performance. It bases output ratings on Class E insulation and a temperature rise of 65°C.

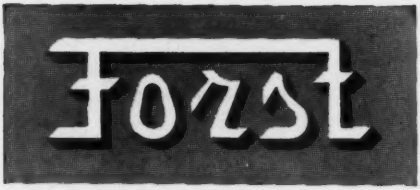
Totally-enclosed fan-cooled motors built to B.S.2083 therefore become obsolete, since they are not interchangeable with motors built to the new Standard. Crompton Parkinson Series 5 T.E.F.C. motors, on the other hand, are completely interchangeable, power for power and frame size for frame size, with C.P. Series 5 ventilated motors, and can be arranged to be dimensionally interchangeable with NEW NEMA motors.

They are available with outputs up to 50 H.P. at 2900 r.p.m.

**Crompton Parkinson** LIMITED

ELECTRICAL EQUIPMENT

CROMPTON PARKINSON LTD., CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2.




**BROACHES**

*We are proud to announce that the internationally famous*

Forst
**BROACHES**

*are now being made in England*

★

**THE COMPANY WISHES TO NOTIFY CUSTOMERS THAT FROM APRIL, 1961, ALL SALES, SERVICE, ETC., OF 'FORST' BROACHING MACHINES AND BROACH GRINDING MACHINES, MADE IN GERMANY, WILL BE OPERATED FROM THE UNDERMENTIONED ADDRESS.**

***We welcome your enquiries for broaches of all kinds, particularly for turbine blades and stainless steel and Nimonic parts.***

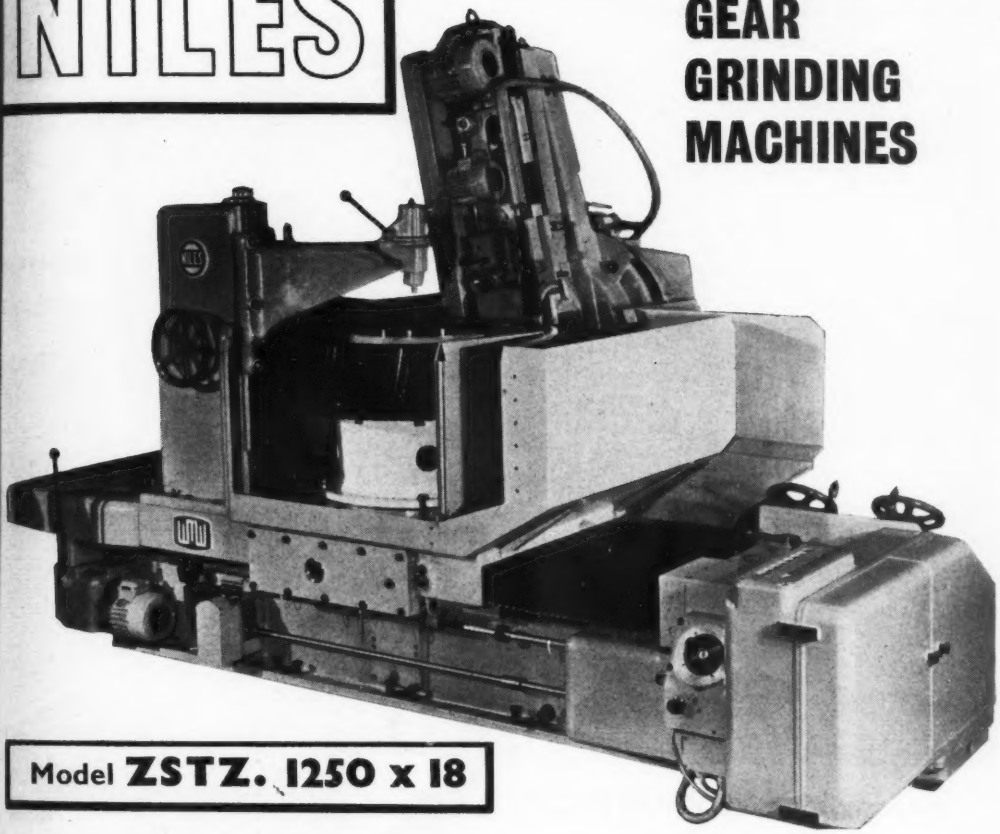
Forst **BROACH COMPANY (G.B.) LTD.**

**DARTFORD ROAD., LEICESTER · TEL.: LEICESTER 31134.**

TELEX NO. 34634 FORST GB LESTER

# NILES

## UNIVERSAL GEAR GRINDING MACHINES



Model **ZSTZ. 1250 x 18**

## *EARLY DELIVERY*

**For precision straight and helical spur gears from 12½" - 49¼" dia.**

**Head swivels up to 45°.**

**Model ZSTZ 315 x 6 is ideal for grinding gear shaper cutters.**

| MODEL | Max. gear dia | Pitch |
|---|---|---|
| ZSTZ. 315 x 6 | 12½" | 1½— 6 mod. |
| ZSTZ. 500 x 10 | 19¾" | 2 —10 mod. |
| ZSTZ. 800 x 14 | 31½" | 2 —14 mod. |
| ZSTZ.1250 x 18 | 49¼" | 3 —18 mod. |

***PLEASE SEND FOR FULL DETAILS***

**ELGAR**

EXCLUSIVE DISTRIBUTORS IN THE UNITED KINGDOM

**MACHINE TOOL COMPANY LIMITED**

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555

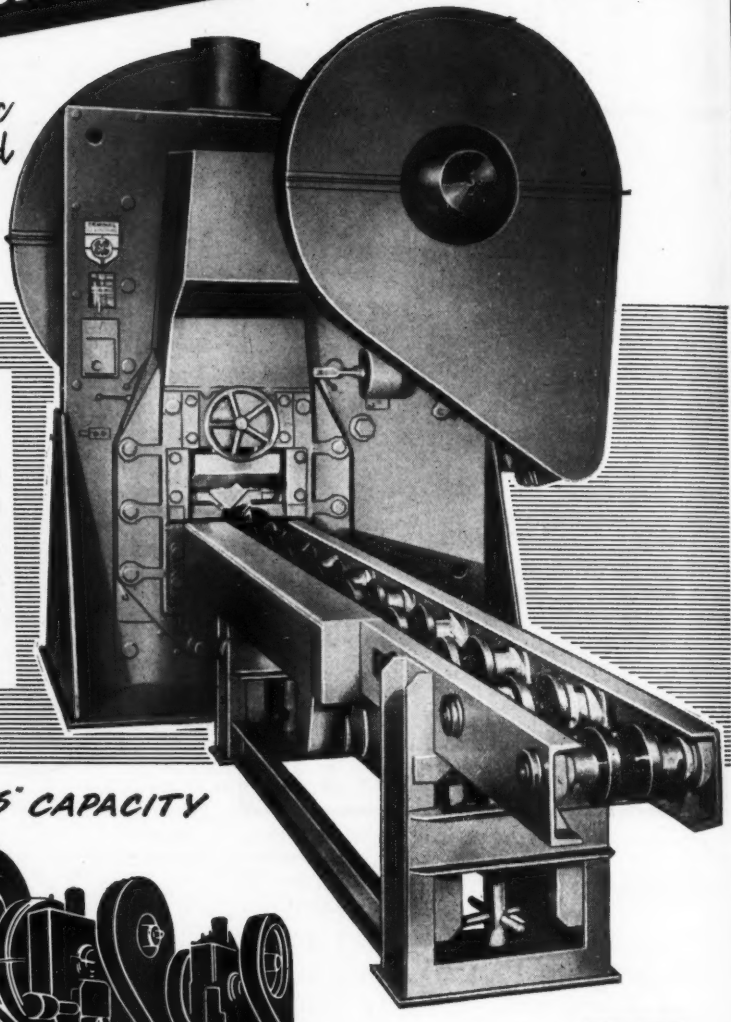
MIDLANDS SHOWROOM: 1075 KINGSBURY ROAD, ERDINGTON, BIRMINGHAM 24. Tel: Castle Bromwich 3781/2

SOLE SCOTTISH AGENTS: ANGUS & CRICHTON (SALES) LTD., 7 MIDLAND STREET, GLASGOW C.1. TELEPHONE: CITY 4560

NRP 2738

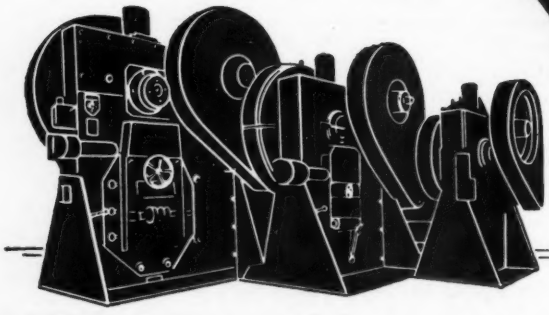
# The PEDDINGHAUS BILLET SHEAR

*with Automatic hold-down and Automatic feed table*



"Peddinghaus"—the well tried and proven Master Shear—for rapid production of Billets and Slabs. Fitted with adjustable length stop, Electro-pneumatic wedge hold-down and single or continuous stroke control.

*RANGE: 4"–6" CAPACITY*

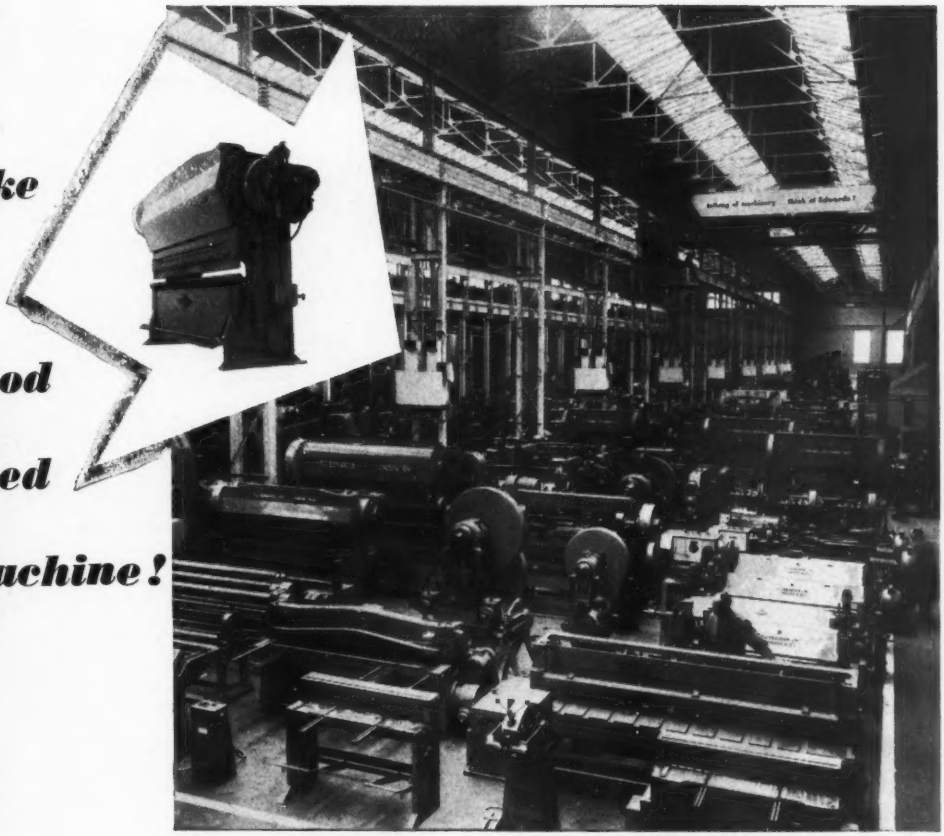


ORIGINAL PEDDINGHAUS

**PAUL GRANBY & CO. LTD.**

39 VICTORIA STREET · WESTMINSTER · LONDON · S W 1

Telephone: ABBEY 5338 Telegrams: POWAFORGE, SOWEST, LONDON Cables: POWAFORGE, LONDON



***take a good used machine!***

**Selecting a good machine to assist or replace existing plant, is so simple . . . just look where there is the biggest choice, and that's in a pretty big spot like The FJE Machine Centre.**

**Have what you will . . . machine tools : presses : sheet metal machines : woodworking machines : press brakes : guillotines : punch and shears : rolling machines : tin box making plant.**

**Action : contact London or Birmingham with your essential needs : inspect at The FJE Machine Centre under the most ideal conditions. The Centre is on the main A1 road near Highbury Corner in North London, easily reached by rail or road : no parking troubles.**

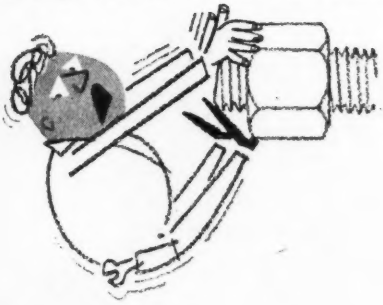
*Choose a good used machine from Edwards — for cash, hire purchase or hire*

**F.J. Edwards Ltd**

**EDWARDS HOUSE, 359-361 Euston Road, London, N.W.1**
Telephones: EUSton 5000 Telegrams: Bescotools London NW1
Telex: 24264 A/B Bescotools Ldn

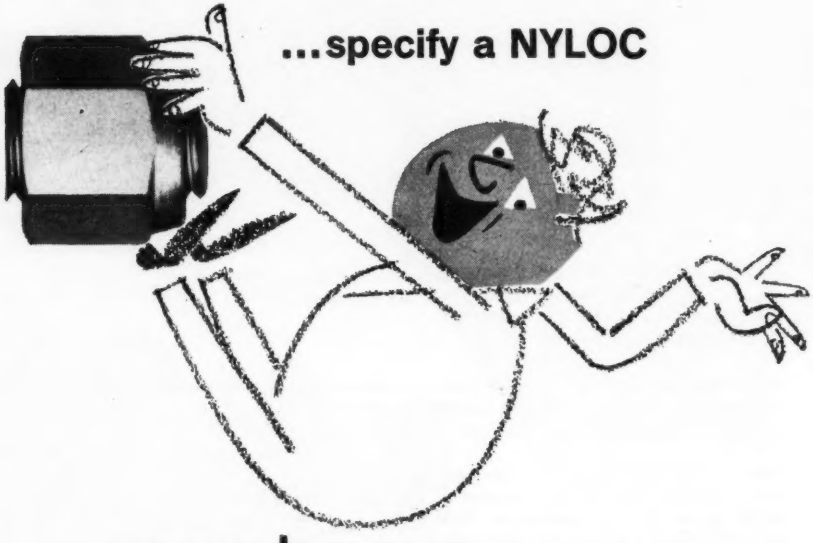
LANSDOWNE HOUSE, 41 Water Street, Birmingham, 3
Telephones: CENtral 7606-8 Telegrams: Bescotools Birmingham 3

# ...when everything depends on a nut



A lot can depend on a single nut—safety, efficiency, your reputation as a manufacturer. If that's the sort of exacting role the nut has to play, there are six good reasons why you should choose a Nyloc : * Nylocs are self-locking anywhere on the bolt thread. * Nylocs stand up to shock, vibration, oil, corrosives and extremes of temperature. * Nylocs can be used again and again. * Nylocs don't damage the bolt thread. * Nylocs have no extra bits and pieces to fit or get lost. * Nylocs save time and money (it takes 40 minutes to assemble 100 ¼" Nylocs as against 60 minutes to assemble 100 ¼" full nuts and jam nuts*) If you want still more reasons, send for the Nyloc brochure—it's free and includes complete tables of all Nyloc types, sizes, threads, materials and finishes.

** These times are based on 'The Handbook of Standard Time Data for Machine Shops' by Haddon & Genger published by Thames and Hudson Limited, London.*



## ...specify a NYLOC

**SIMMONDS AEROCESSORIES LIMITED**

**TREFOREST, PONTYPRIDD, GLAMORGAN**

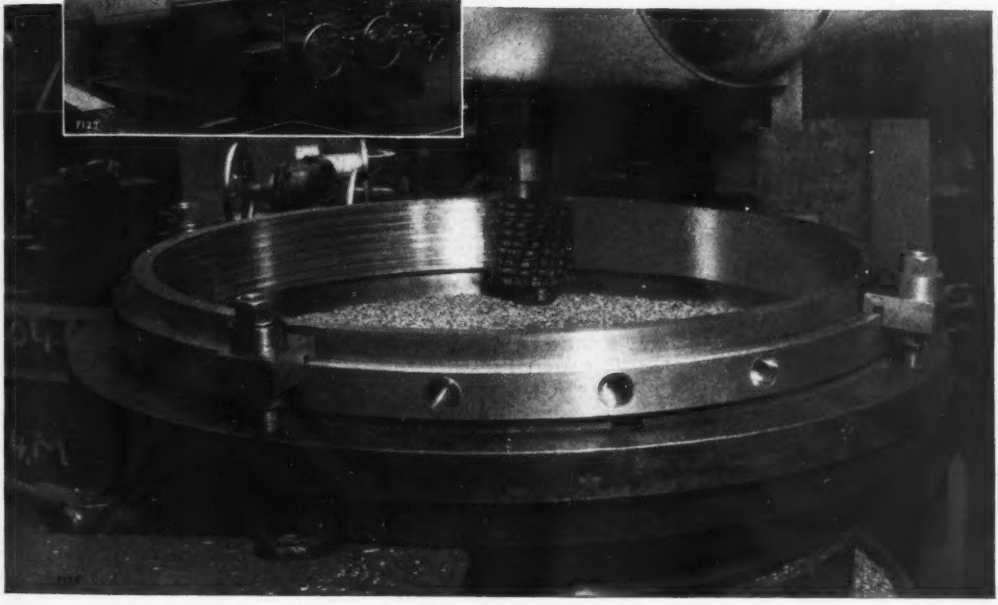
Branches: LONDON · BIRMINGHAM · MANCHESTER · STOCKHOLM COPENHAGEN · BALLARAT · SYDNEY · JOHANNESBURG · NAARDEN MILAN · NEW YORK · BRUSSELS AND MANNHEIM

A MEMBER OF THE FIRTH CLEVELAND GROUP FC

CRC 51H

# *Modern Milling*

## on a HERBERT N°47V VERTICAL MILLING MACHINE



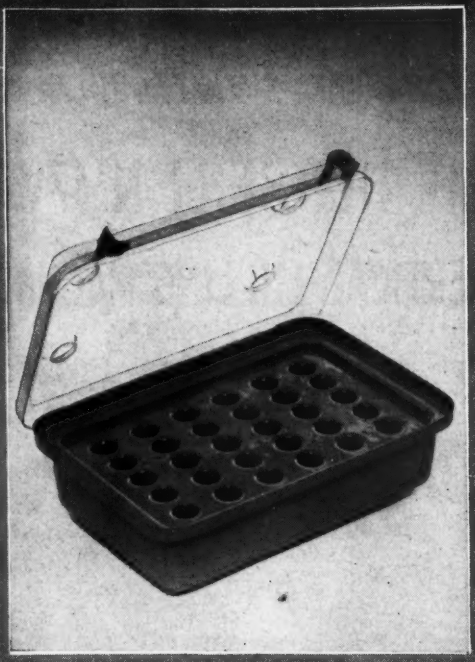
*The No. 47V equipped with a self-contained power-operated circular table for machining a series of angular grooves in a 17" diameter nickel-loaded-bronze turbine labyrinth gland rings.*

The design and construction of the No. 47V has been based on a long experience in the requirements of the modern milling department. It has the power and rigidity necessary to deal with heavy metal removal on tough steels; speed and feed ranges, combined with a high degree of accuracy, enable fine finishing operations to be done rapidly and efficiently. Capacity 48" x 16" x 23".

ALFRED HERBERT LTD., COVENTRY

AD 569

*When answering advertisements kindly mention MACHINERY.*



The General Celluloid Co. Ltd. vacuum-formed this tote box and the transparent lid from tough, stable Cobex rigid vinyl sheet.

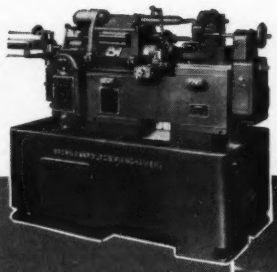
# Cobex for toughness

COBEX rigid vinyl is tough, non-inflammable and dimensionally stable. It resists most chemicals, including mineral acids and alkalis. It is produced in transparent and opaque colours as well as clear transparent and translucent white. There is also a special outdoor range of lightfast colours. Cobex is used in deep draw moulding, vacuum or drape forming and hot gas welding.
COBEX is supplied in sheet or calendered rolls and extruded sheeting. There are also various multi-colour laminated sheets for engraving.

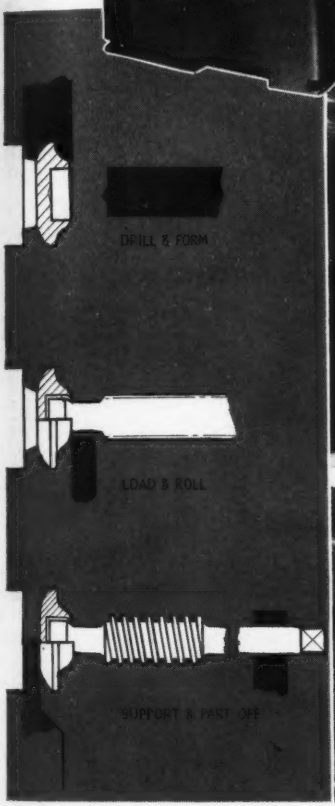
**BX PLASTICS LTD**
*The British Xylonite Group*

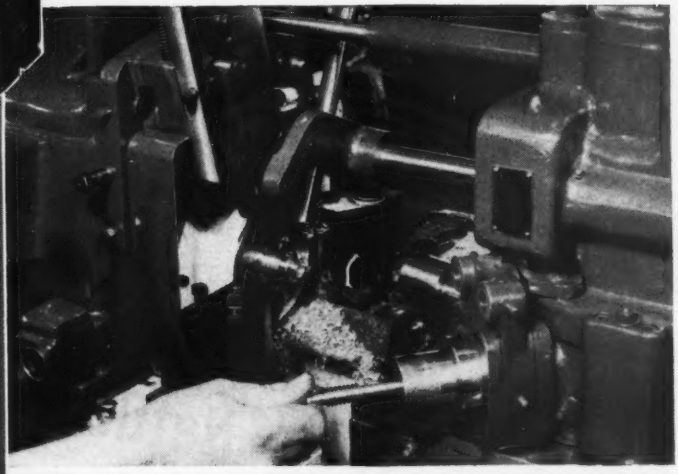
BRANTHAM · MANNINGTREE · ESSEX
*Telephone: Manningtree 401*

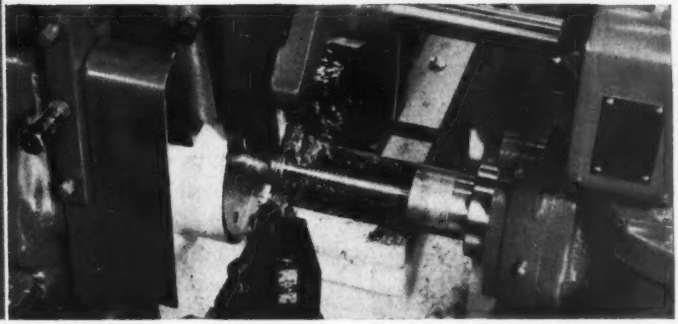
TA 5567



# *simplicity of repetition machining on —*





*A Brown & Ward 1¼in. 4-Operation Bar Automatic produces brass clack valves at the rate of 3.6 components per minute.*

*After the forming and drilling, the machined stem is loaded into the loading head on the turret and inserted in the valve body.*

*The wall of the valve head is peened over the edge of the stem, prior to parting-off.*

## BROWN & WARD
## *single-spindle BAR AUTOMATICS*

**Uses simple *standard* cams and tools.**

**Wide range of attachments increases versatility.**

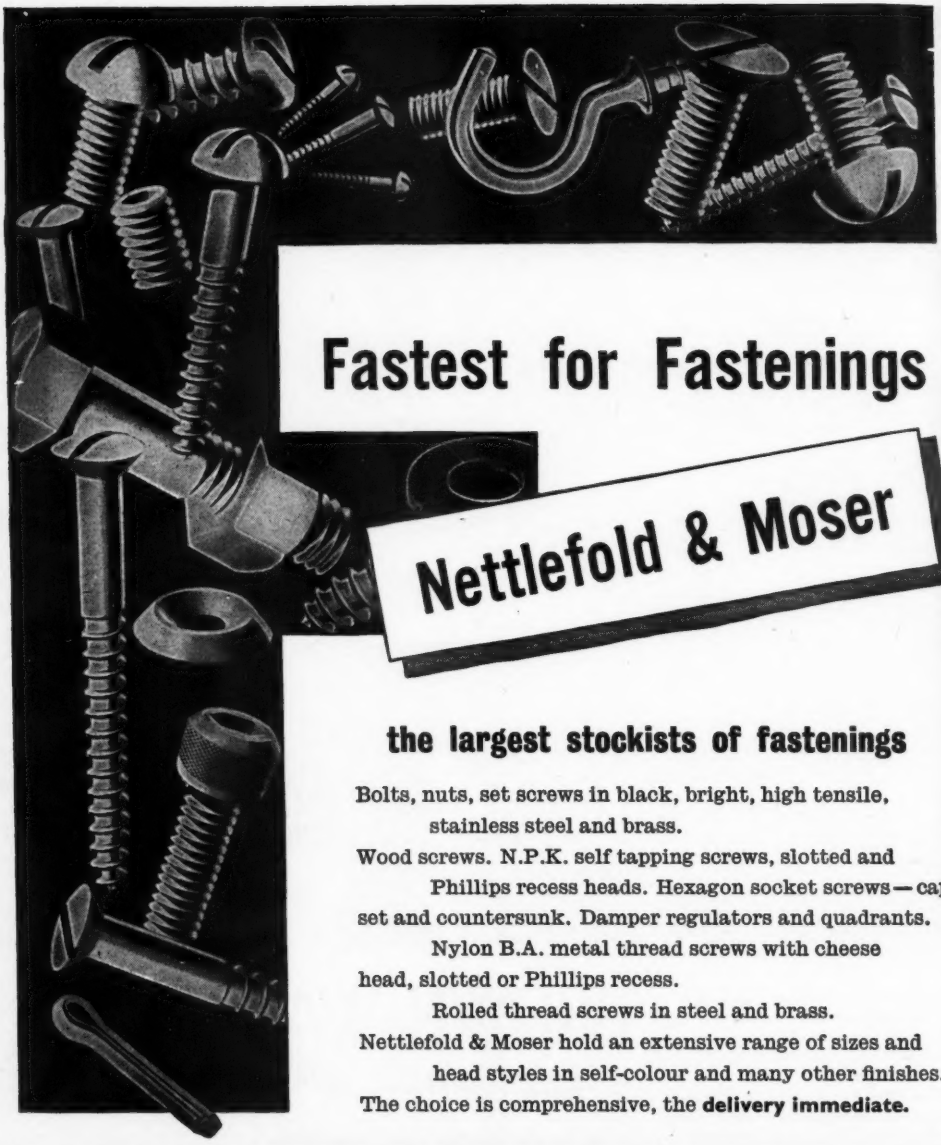
**Competitive to six-station machines relative to low capital outlay.**

**Six sizes, three types, for work up to 1½" dia. x 4½" long.**

ALFRED HERBERT LTD., COVENTRY *Factored Division, Red Lane Works.*

AD 638

*When answering advertisements kindly mention MACHINERY.*



# Fastest for Fastenings

## Nettlefold & Moser

### the largest stockists of fastenings

Bolts, nuts, set screws in black, bright, high tensile, stainless steel and brass.

Wood screws. N.P.K. self tapping screws, slotted and Phillips recess heads. Hexagon socket screws—cap, set and countersunk. Damper regulators and quadrants.

Nylon B.A. metal thread screws with cheese head, slotted or Phillips recess.

Rolled thread screws in steel and brass.

Nettlefold & Moser hold an extensive range of sizes and head styles in self-colour and many other finishes.

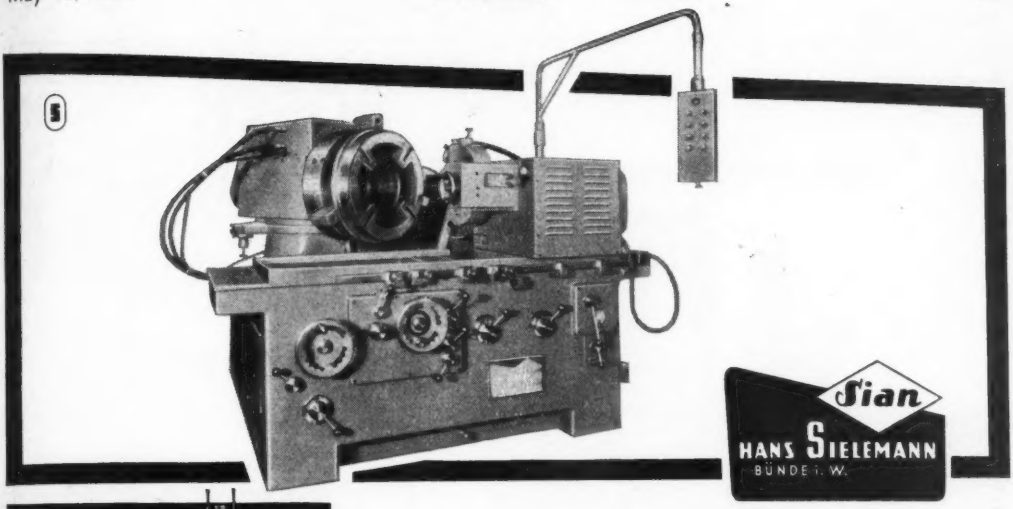
The choice is comprehensive, the **delivery immediate.**

*You save time by ringing* Nettlefold & Moser *first*

**NETTLEFOLD & MOSER LTD.,**

**LONDON:** BOX 378, 170/194 BOROUGH HIGH STREET, S.E.1 TELEPHONE: HOP 7111 (40 LINES) ● **BOOTLE:** DUNNINGS BRIDGE ROAD, BOOTLE 10, LANCS. TEL: AINTREE 4171 (6 LINES) ● **HULL:** 201 SCULCOATES LANE. TEL: HULL 41341 (3 LINES)

NM 45



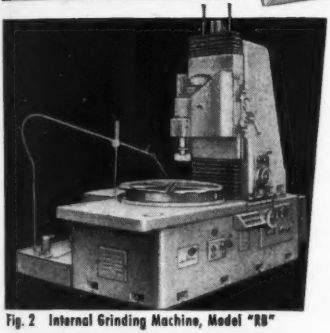



Fig. 2 Internal Grinding Machine, Model "RB"

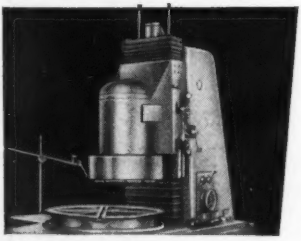


Fig. 3 Rotary Table Surface Grinding Machine Model RF

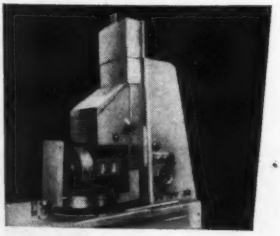


Fig. 4 Rotary Table Surface Grinding Machine, Model RF-Pe.

Fig. 1 **Automatic, Hydraulically Controlled Cylindrical, Face and Internal Grinding Machine, Model "RPB"**

- Several grinding operations, i.e. Cylindrical-, Surface-, Taper- and Internal Grinding on one component are done in the same mountings, thus avoiding separate clamping times for each grinding operation (Fig. 1)
  Range of Application: Up to 50" component diameter.

- Model "RB" (Fig. 2) is suitable for heavy components
  Range of Application: Internal grinding up to 48" diameter
  Length of bore up to 20"

  Lower situated surfaces can be ground.

  Cylindrical grinding with internal grinding spindle. Dimensions of spindle accordingly.

- Model "RF" Rotary Table Surface Grinding Machine with segmental head (Fig. 3)

- Model "RF-Pe" Rotary Table Surface Grinding Machine with periphery grinding wheel (Fig. 4)

- The Types "RB" - "RF" - "RF-Pe" correspond in their construction the built-up system. The grinding spindle stocks are interchangeable.

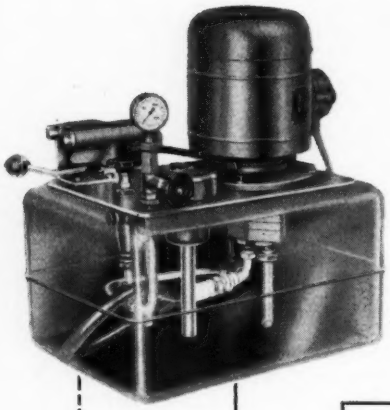
- Range of application: Surface grinding up to 52" diameter

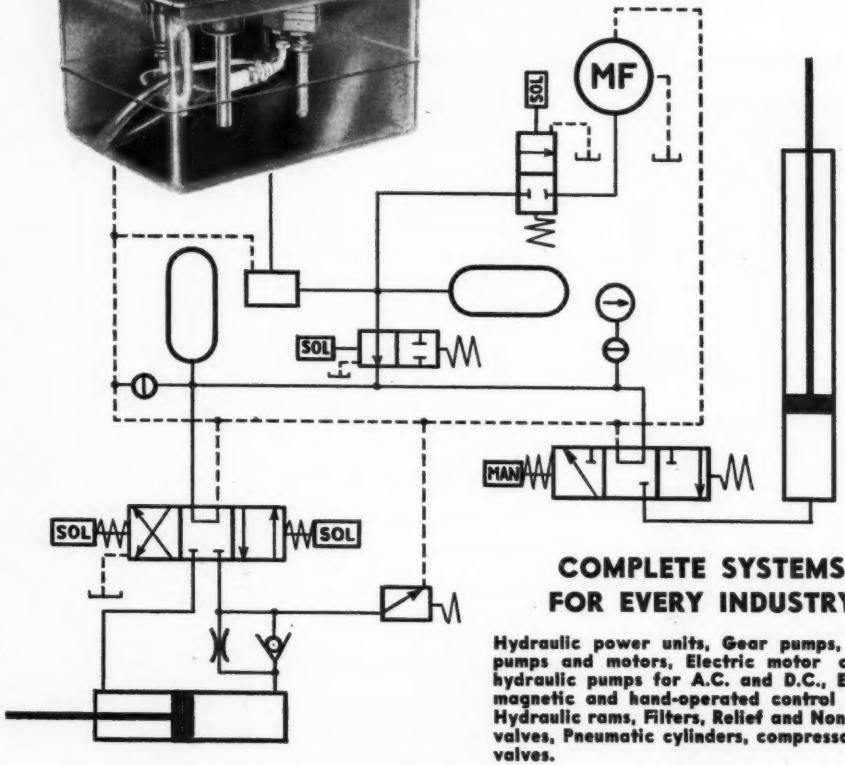
**Sole Agents:**

## W·FERD·KLINGELNBERG SÖHNE·REMSCHEID
## (GERMANY)

**In Great Britain: Sykes Machine Tool Co. Ltd., Staines-Middx.**

# BOSCH
## Hydraulic
and
## Pneumatic
## Equipment






**COMPLETE SYSTEMS FOR EVERY INDUSTRY**

**Hydraulic power units, Gear pumps, Piston pumps and motors, Electric motor coupled hydraulic pumps for A.C. and D.C., Electro-magnetic and hand-operated control valves, Hydraulic rams, Filters, Relief and Non-return valves, Pneumatic cylinders, compressors and valves.**

***Our industrial division will forward complete details to Engineers***

# BOSCH LIMITED

CARLISLE ROAD, HENDON, LONDON, N.W.9 Teleg: ELECBRIGHT, PHONE, LONDON Tel: COLINDALE 0161

# ALL THESE INTERNAL FORMS ARE EASY WITH A...

# FRÖMAG

## KEYSEATER

**There is a FROMAG Keyseater to suit your requirements whether keyways are from $\frac{1}{8}$" to 10" wide, up to 98" in length, bores from $\frac{1}{2}$" to 59" diameter can be handled.**

This range of machines are economic units whether for mass production, small batch quantities or single parts, where high accuracy, efficiency and speed are a necessity. They can handle small pinions with $\frac{1}{2}$" bore to ships' propellers with 5' bores weighing 30 tons.

Model KZ.50 for keyways from $\frac{1}{8}$" to $1\frac{3}{4}$" in width and up to $17\frac{3}{4}$" length.

Even 25% utilisation makes the FROMAG Machines an economic proposition. A combined tilting and floating table can be supplied for cutting keyways in cylindrical bores and for keywaying taper bores. The larger machines can also be used as vertical broaching machines, 6-ton capacity.

# MORTIMER

EXCLUSIVE DISTRIBUTORS OF THE FINEST MACHINE TOOLS

MORTIMER MACHINE TOOL CO. LTD : MORTIMER HOUSE : ACTON LANE : LONDON NW10 Tel: ELGar 3834-5-6

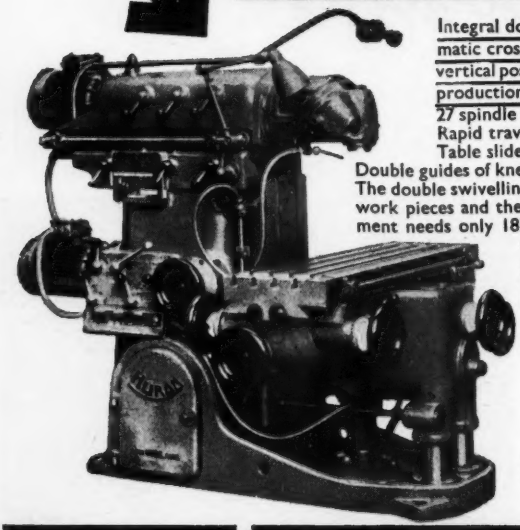
NRP 5080A

SLIDING RAM GIVES 27½in. AUTO CROSS FEED

# HEAVY DUTY MILLING

ANGULAR COMPOUND HORIZONTAL VERTICAL

# HURON SUPER UNIVERSAL MILLERS



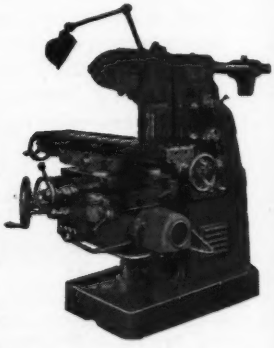
Integral double swivelling universal head provided with 27½in. automatic cross feed by the sliding ram, can be set to the horizontal or vertical position, or to any angle instantaneously—permits the heaviest production cuts. Head can be retracted completely from table line. 27 spindle speeds from 30 to 2,066 r.p.m., 27 feeds from $\frac{1}{16}$in. to 30in. Rapid traverses in all directions. All operating controls duplicated. Table slides directly in the knee without cross movement or swivel. Double guides of knee permit components in excess of 1½ tons to be machined. The double swivelling universal head requires an opening of only 14in. to enter work pieces and the whole sliding ram with its 27½in. automatic cross movement needs only 18in. clearance. OPTIONAL EXTRA FEATURES: Mounted spacing casting assemblies providing additional 8in. capacity under spindle. 26in. wide 8 T-slot tables and 39⅜in. automatic cross feed of sliding ram with special heavy duty knee and front operating position.

| Type | Table | Automatic Feeds Long | Cross | Vert. |
|---|---|---|---|---|
| KU4 | 56⅞in. × 15¾in. | 43½in. | 27½in. | 19⅜in. |
| KU5 | 64⅞in. × 15¾in. | 51½in. | 27½in. | 19⅜in. |
| KU6 | 78⅜in. × 16½in. | 59in. | 27½in. | 19⅜in. |
| KU55 | 64⅞in. × 26in. | 51½in. | 38⅜in. | 18⅞in. |
| L83 | 157in. × 59in. | 118in. | 39⅜in. | 59in. |

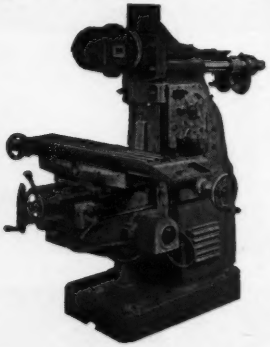
**Type 'L' Open-side Traversing Head Universal Miller will mill, bore, slot and drill the largest work-pieces at one setting.** The unique design permits greatest variety of operation on large work-pieces; the component remains stationary on the large work-table. Upright slides full length of base table and the sliding ram moves vertically and horizontally.

# DUFOUR UNIVERSAL MILLERS

*WITH DOUBLE UNIVERSAL SWIVELLING HEAD, RETRACTABLE SLIDE BRACKET AND SPACING CASTING GIVING 26" DAYLIGHT ON No. 59 AND 21" ON No. 61*



FOR ALL MODELS Direct reading dial change for speeds and feeds. All parts subject to wear hardened and ground and completely interchangeable. Built to closest tolerances. Rapid traverses in all directions. Table swivels 30°. No. 40 taper for main horizontal spindle, double swivelling universal head, dividing head and rotary table. Hardened and ground centre guide for slideways. Twin overarms. Double swivelling sliding spindle heads with speeds 53-3000 r.p.m. Double swivelling universal head on retractable slide bracket providing with 5½in. Spacing Casting Drive assembly on 59 Machine 26in. daylight, and 21in. on No. 61.



MODELS 53 & 61. 16 universal head spindle speeds 21-1600 r.p.m.; 8 horizontal spindle speeds 21-1180 r.p.m.; 8 automatic feeds ½-18¾in.

MODEL 59. 36 universal head spindle speeds 14-1780 r.p.m.; 12 horizontal spindle speeds 21-1180 r.p.m.; 16 automatic feeds ½-20in.

MODEL 54. Automatic cross feed of universal head 20in.; 18 universal head spindle speeds 12-1500 r.p.m.; 36 horizontal spindle speeds 6-1500 r.p.m.; 18 automatic feeds $\frac{1}{16}$-23½in.

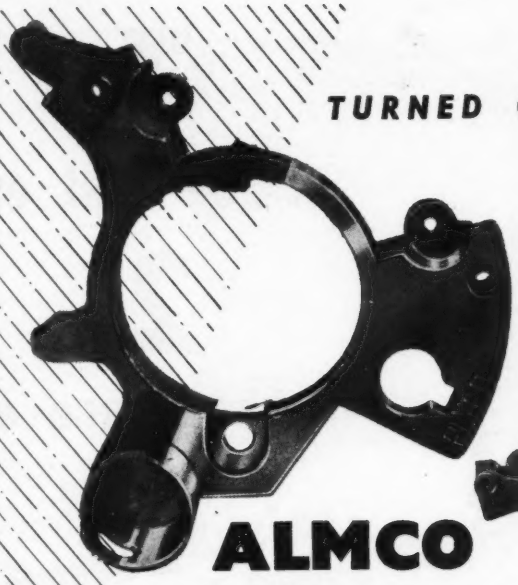
| Type | Table | Automatic Feeds Long. | Cross | Vert. |
|---|---|---|---|---|
| 53 | 43½in. × 9¾in. | 27½in. | 9¾in. | 15¾in. |
| 61 | 47½in. × 10¾in. | 30¾in. | 9¾in. | 15¾in. |
| 59 | 51$\frac{1}{16}$in. × 11¾in. | 34¾in. | 11$\frac{13}{16}$in. | 21$\frac{1}{16}$in. |
| 54 | 67in. × 14¾in. | 43¾in. | 14¾in. | 20½in. |

**Send for full particulars of our very extensive range of these machines; ask for demonstration.**

**Rudolph Carne & Co. Ltd.** SWAN WORKS, FISHERS LANE, CHISWICK, LONDON, W.4.

Telephone: CHISWICK 0514 & 6585. Inland Telegrams: RUDCAR, CHISK, LONDON. Overseas Telegrams: RUDCAR, LONDON.

TURNED OUT FINE AGAIN...



# ALMCO SPEED FINISHING

## GIVES THE SAME UNIFORM FINISH EVERY TIME . . . TEN TIMES FASTER

Using Almco Supersheen barrel-finishing equipment and materials, *unskilled* operators can turn out *precision* DEBURRING, DESCALING, BURNISHING, POLISHING, etc., with practically no rejects, with savings of up to 87%, at ten times the speed of hand-finishing.

To prove to yourself that such savings are realities, we invite you to send any unfinished component you choose to our development laboratory where it will be processed FREE OF CHARGE. Its finished appearance—together with the detailed report provided—will convince you that Almco products are *essential* in keeping pace with modern production methods.

Why not ask us to call? Or, better still, call and see your own products undergoing processing.

ALMCO

Supersheen

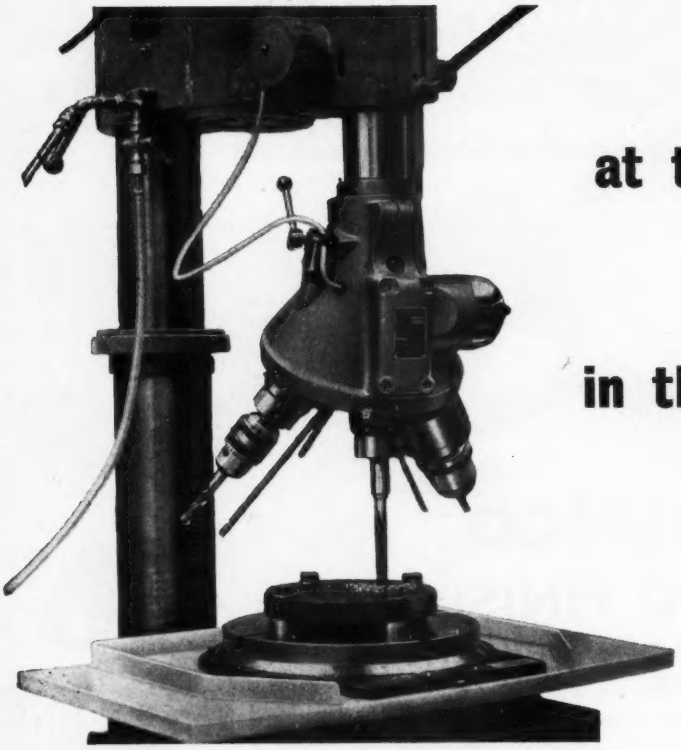
BURY MEAD WORKS : HITCHIN : HERTS

Telephone: Hitchin 3669

A Division of the King Seeley Corporation, Ann Arbour, Michigan, U.S.A.

Model DB400/3/36 one of a wide range of Almco machines. Please send for details.

U.S.A. Almco Division, Albert Lea, Minnesota. HOLLAND (Rotterdam) N.V. Technische Handelsonderneming "Carborundum Aloxite" BELGIUM & LUXEMBURG (Bruxelles) Tecnimetal Societe Anonyme. SWEDEN (Stockholm) Trumlingsaktiebolaget. SWITZERLAND (St. Gallen) L. Kellenberger & Co. SOUTH AFRICA (Johannesburg) Barry Colne & Co. (Pty.) Ltd. AUSTRALIA & NEW ZEALAND (Melbourne) Hardie Trading Ltd.



# 7
# at the cost of
# 2
# in the space of
# 1

1in. capacity, three-station ARBO Head and 12in. dia. THOKA Table on GRIMSTON Electriska Drilling Machine.

**The ARBO AUTOMATIC TURRET DRILL HEAD**

is better than a seven-headed multi-spindle drilling machine. For the same work it uses a fraction of its space, reduces handling time, and costs considerably less. There is no better way to increase your drilling capacity.

Indexing of the Turret is positive, power operated and automatic. Independent depth control and a choice of ten tool speeds or of self-reversing tapping spindles are available in each station. Up to seven stations. Two sizes : ¾in. and 1in. capacity in steel.

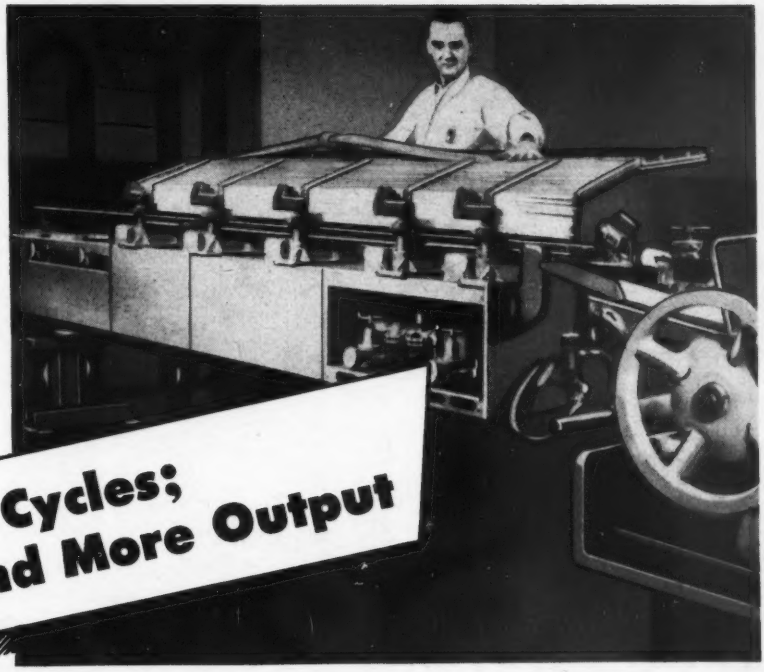
**The THOKA FLOATING COMPOUND TABLE**

floats on air for effortless positioning and is locked by air pressure during drilling or tapping. Foot operation pneumatic control. Arranged for indexing and dividing, for drilling on any P.C.D. without prior marking.

***The combination of ARBO Head and THOKA Table cuts unproductive handling times to the bone.***

**THOKA** **MACHINERY SUPPLIES LTD.**

**2 DRAPERS GARDENS, LONDON, E.C.2** Phone: NATional 7391



# Faster Cycles; and More Output

## *with Less Fatigue and Higher Sustained Production*

Machine speed — not worker efficiency — governs production on automatics equipped with Lipe Automatic Machine Loading Bar Feed. That's because Lipe takes over the tedious, back-breaking hand-loading — leaves the machinist free to concentrate on quality . . . machine set-ups . . . care of tools.

## The LIPE AML Bar Feed

automatically and continuously feeds stock of practically any length, shape or material in close-tolerance feedouts. Users report production increases of 40 per cent. . . . 90 per cent. . . . even 200 per cent. per machine, plus labour benefits that are even more important.

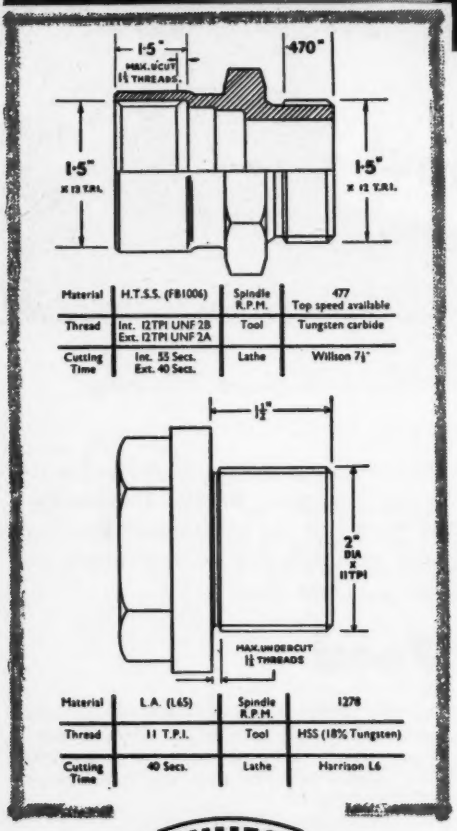
***Stop Cutting Air and you Start Cutting Costs***

*Send for Data to Dept. M.3351*
*Patents Nos. 728898, 743461 and 827417*

Automation Ltd.
DEVONSHIRE HOUSE VICARAGE CRESCENT LONDON S W 11
PHONE: BATTERSEA 5549

NRP 3487

# *Revolutionary* CENTRE LATHE SCREWCUTTING




| Material | H.T.S.S. (FB1006) | Spindle R.P.M. | 477 Top speed available |
|---|---|---|---|
| Thread | Int. 12TPI UNF 2B Ext. 12TPI UNF 2A | Tool | Tungsten carbide |
| Cutting Time | Int. 55 Secs. Ext. 40 Secs. | Lathe | Wilson 7½" |




| Material | L.A. (L65) | Spindle R.P.M. | 1278 |
|---|---|---|---|
| Thread | 11 T.P.I. | Tool | HSS (18% Tungsten) |
| Cutting Time | 40 Secs. | Lathe | Harrison L6 |

In the same way that the chasing dial has superseded the old method of marking chuck, headstock, leadscrew collar and bracket, the AINJEST HIGH SPEED SCREW-CUTTING ATTACHMENT has established a further major advance in screwcutting techniques. Its use on standard centre lathes allows the automatic engagement and disengagement of the leadscrew at the highest spindle speeds of which the machine is capable.

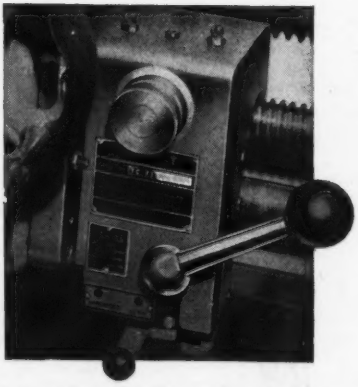
★ The cut cannot be started at the wrong point.

★ The cut is stopped accurately so that external or internal threads can be cut tight to a shoulder at high speeds.

★ Tungsten carbide tools can be used with great advantage.

★ Chasing dial is eliminated.

★ The attachment remains in position, ready for use without restricting the versatility of the lathe.



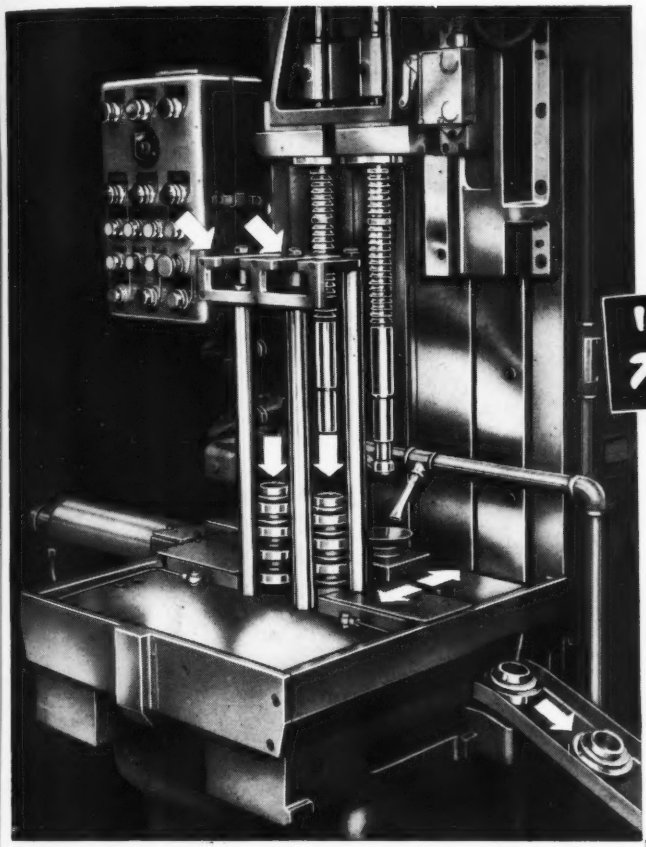
AINJEST *High speed* **SCREWCUTTING ATTACHMENT**

● *stockists of carbide threading tools*

Write for details and prices to Dept A.S.C.

**SAUNDERSON & COSTIN LTD · HIGHCLERE · NEWBURY · BERKS · ENGLAND · Tel.: HIGHCLERE 448**

The
inte
The
and
The
sma
acc
Th
200
Ser
ava
WI
Br
Br
be
br



FORD

OF DAGENHAM

USE

AUTOMATIC

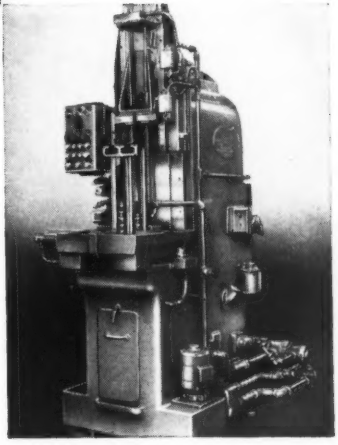
'American'

BROACHING

MACHINES

BUILT & TOOLED BY

MATRIX



The above illustration shows a fully-automatic set-up for internal broaching of gears.

The pre-stacked components are loaded, clamped, broached and ejected automatically.

The tooling is readily converted to accommodate larger or smaller components, and is fool-proofed to guard against accidental damage.

This fully automatic, electrically controlled machine produces 200 components per hour.

Semi-automatic cycle models and untooled machines are available.

When you specify tooled-up British-built 'AMERICAN' Broaching Machines, you can be sure that the Machine, Broaches and Fixture will operate in perfect co-ordination, because they are designed that way with your particular broaching requirements in mind.

*For further particulars write or telephone TODAY*

ROCKWELL
MACHINE TOOL CO. LTD.

WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

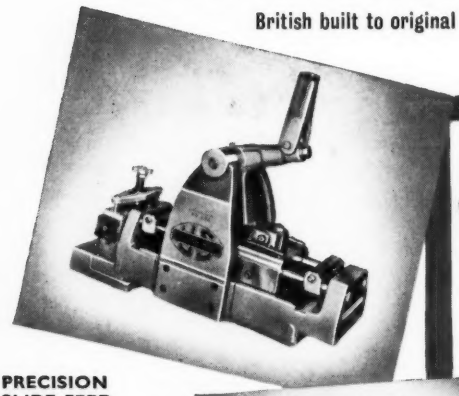
ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822

ABV/7

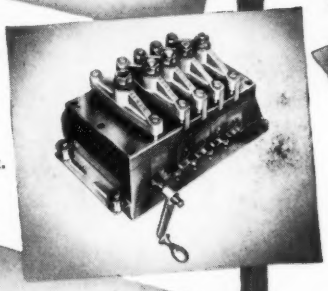
## *Every Press Shop deserves the Best in*

# COIL HANDLING Equipment

**British built to original U.S. Tool Co. design**



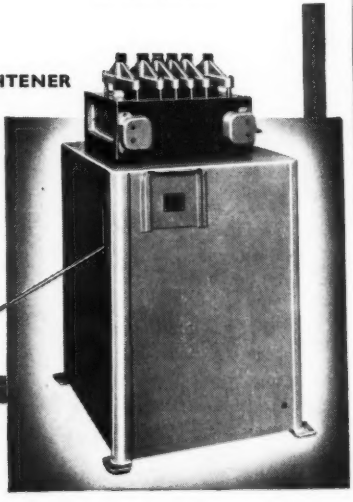
**PRECISION SLIDE FEED**
Operated by press drive shaft. Easy change of feed length without connecting rod adjustment. Two sizes for material up to 6″ or 9″ wide by ¼″ thick.



**MULTI-ROLL ECONOMY CRADLE**
Easy and rapid loading of coils up to 9″ wide, either by hand or overhead crane. Power driven take-out rolls synchronized with coil rest rollers.

**PLAIN STOCK STRAIGHTENER**
For use with slide feeds.

**POWER STRAIGHTENER**
Top rolls adjustable individually. Loop control. Two models: maximum capacities 6″ and 10″.



**AUTOMATIC STOCK REEL**
Easily loaded. Loop control. Equally suitable for feeding or rewinding scrap. Horizontal and plain models available.

*For further particulars write or telephone TODAY*

**ROCKWELL**
MACHINE TOOL CO. LTD.

**WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033**

**ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822**

PR 17

# COLD HOBBING PRESSES

BY SACK & KIESSELBACH

SEVERAL SIZES from 100—3,000 TONS CAPACITY
MASSIVE CAST STEEL BODY
PATENT SWIVELLING CLEAR-VIEW GUARD
CAN BE USED with DEPTH or PRESSURE LIMITING DEVICE
BUILT FOR THE JOB

Note depth measuring device, automatically stopping machine when required depth has been reached.

SACK & KIESSELBACH have for many years been building Cold Hobbing Presses. These machines are therefore not adaptations but are designed and built for this work only. Their sound, robust basic design, high quality workmanship plus several special features found only on these machines greatly facilitates the production of sound moulds. Further details on request.

**ROCKWELL**
MACHINE TOOL CO. LTD.

WELSH HARP, EDGWARE ROAD, LONDON, N.W.2. TEL: GLADSTONE 0033

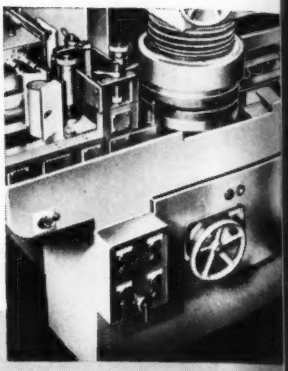
ALSO AT • BIRMINGHAM - TELEPHONE SPRINGFIELD 1134/5 • STOCKPORT - TELEPHONE STOCKPORT 5241 • GLASGOW - TELEPHONE MERRYLEE 2822

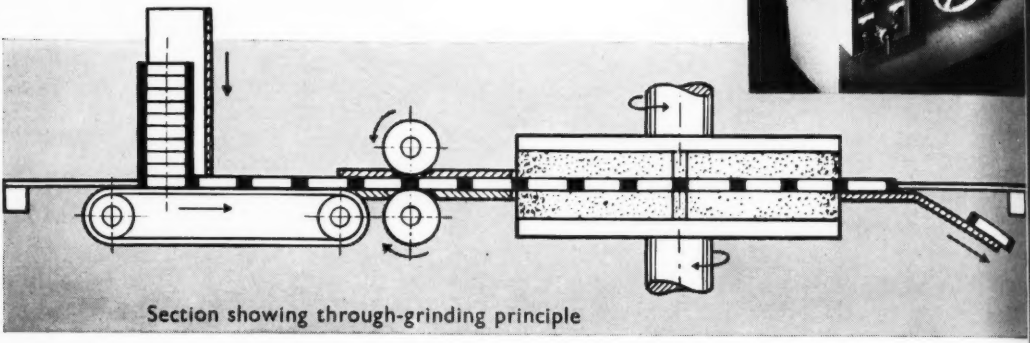
SK1

TWIN SPINDLE

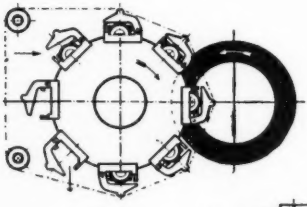
# DISKUS

## Surface Grinding Machines

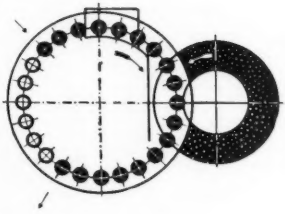




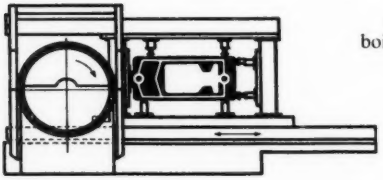
Section showing through-grinding principle



Rotating workholding fixture



Grinding of free workpieces in rotating fixture



Grinding of boiler members

## Simultaneous Double-Sided Grinding—With and Without Fixtures

Diskus manufacture a wide range of twin spindle surface grinders for the fast and accurate grinding of workpieces from circlips to large boiler members. If you produce in quantity components with parallel ground faces, please send us details and we will be glad to submit a full quotation for a suitable machine.

**ROCKWELL**
MACHINE TOOL CO. LTD.

*For further particulars write or telephone TODAY*

**WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033**

**ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2022**

DDI Diskus

1961

ded

urate

e

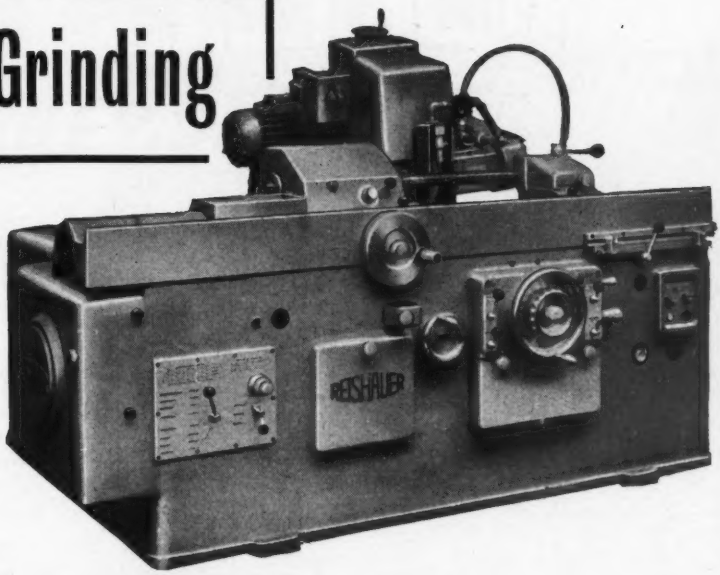
se

t a

E 0033

E 2022

# For Absolute PRECISION in Thread Grinding




SWISS **REISHAUER**

## UNIVERSAL THREAD GRINDER MODEL US

Thread gauges, precision threaded components, relief ground cutting tools and worm threads can be ground with exceptional accuracy of pitch, diameter and form. Almost any thread can be ground — external or internal, left or right hand, single or multi-start — *and* taper threads without setting over the table or tail-centre.
The machine is equally economical on batch work or single components. Minute pitch corrections as small as .00008" per inch can be made. Single or multi-ribbed grinding wheels can be employed — and two way grinding.
The grinding head can be swivelled up to 40° left or right.

*Grinding length 17¾". Length between centres 42½".*
*Work diameter 5/64" to 9¾". Bore through work spindle 1.77".*
*Pitches 80 t.p.i. to 4", Grinding wheel speeds 1700 to 2540 r.p.m.*

**Send for fully illustrated brochure M/183**

SOLE U.K. DISTRIBUTORS:

**DOWDING & DOLL LTD**
**346 KENSINGTON HIGH STREET, LONDON, W.14**
Tel: WESTERN 8077 (8 lines) Telex: 23182 Grams: ACCURATOOL LONDON TELEX

183

# Brookman Selfeedrils

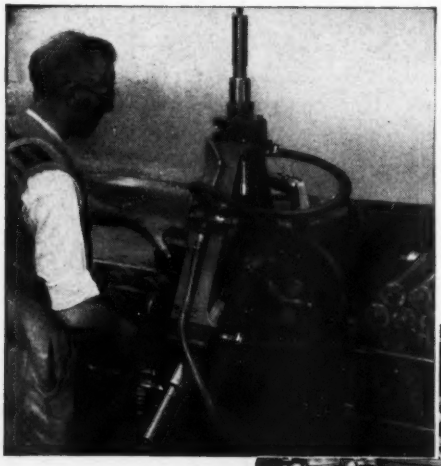
**A system of self feeding air operated unit heads which will work any material—metal, wood or plastics—with a full range of mounting clips for very close centres or the widest deployment.**

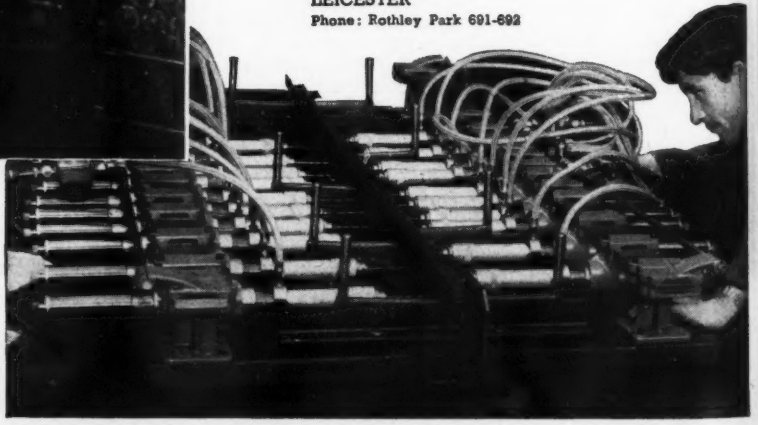
- **Single hose supply**
- **Automatic return**
- **Rapid approach**
- **Break through control**

**SELFEEDRIL AT.MOC.2500**

The 'Selfeedril' is a self-contained unit head with built in forward and reverse mechanism, rapid approach and feed speed adjustment. Only one air hose is needed to supply each unit, and control is by a single elementary on-off valve. Maximum chuck capacity ¼" dia. Forward feed 1½" and 2¼"

*Photograph by courtesy of Richard Sutcliffe Ltd.*





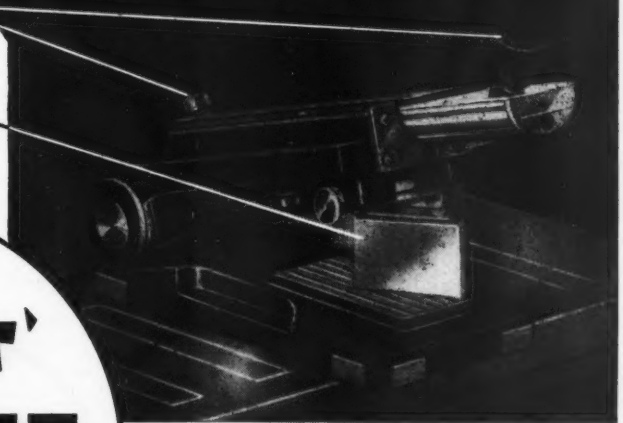
**R. S. BROOKMAN LTD.**
Parkside Works
**ROTHLEY**
LEICESTER
**Phone: Rothley Park 691-692**

*For further details of this unique system write for Leaflet SFM.4*

# 'HABIT'

## VERSATILE ANGLE DRESSING ACCURATE TO 20 SECONDS!

* Simple, certain and safe angle dressing on surface and Tool and Cutter Grinders.
* The diamond and operating handle are interchangeable to provide maximum application.
* The Sine bar principle eliminates risk of error, however close the required tolerance may be.



*The*

**'HABIT'**

*REGD.*

# DIASINE

## SINE ANGLE DRESSER

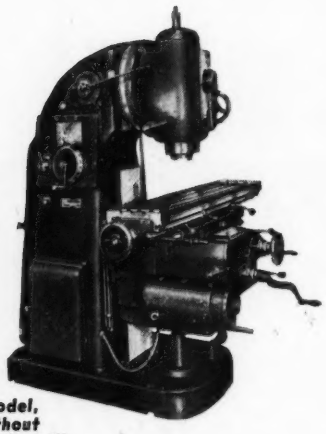
A high class tool constructed of best quality materials with hardened working surfaces. It is immediately applicable to all types of surface and tool and cutter Grinders for angular dressing of abrasive wheels to a precision of 20 seconds with remarkable simplicity and speed. The time saved over existing improvised methods rapidly pays for this low-priced instrument.

*Full technical data on the selection and application of all diamond tools is readily available on request.*

HABIT DIAMOND TOOLING LTD., LURGAN AVENUE, LONDON, W.6. Telephone: FULHAM 7944

# 'HABIT'

MODEL RFV



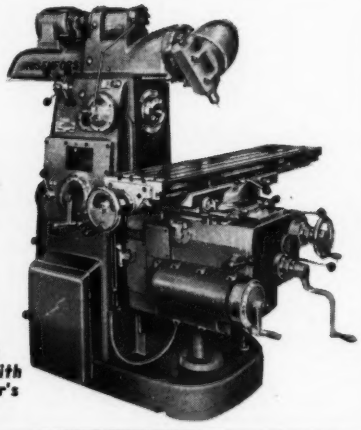
*Vertical model, with or without power feed to quill*

# *Consider these Machines*

**WHEN NEXT YOU GO SHOPPING FOR**

**1st CLASS MILLING MACHINES**

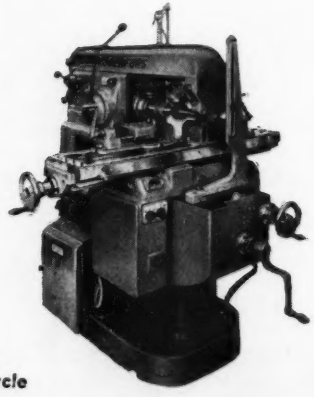
MODEL RFU



*Universal model, with toolmaker's overarm*

**ROSENFORS** Precision Milling Machines incorporate all the features to be expected in a modern high quality machine-tool. The accent is on reliability and ease of handling. All machines have table size 51″ x 12″, the powered feed and rapid traverse motions being 28½″, 10¾″ and 16¾″ respectively. In conformity with Rosenfors practice, all spindle drive gears are hardened and ground. There are 18 spindle speeds (33-1,500 r.p.m.) and 16 feeds powered by a separate motor in the knee.

MODEL RFE-P



*Production model, with automatic cycle*

# *See these Machines*

**during "EXHIBITION FORTNIGHT"**

**At**

## MONKS & CRANE LTD.

**GARRETTS GREEN LANE**

**BIRMINGHAM 33**

**8th — 19th MAY**

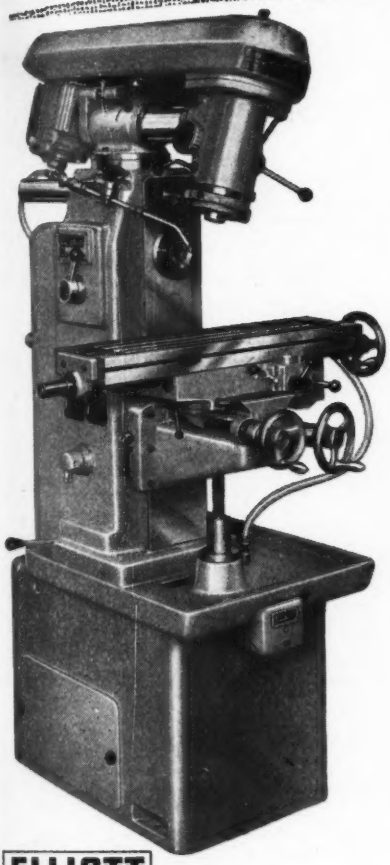
KAVANAGH O'MOORE & CO., LTD.

1st. FLOOR · 34/35 QUEEN STREET · LONDON · E.C.4.

Telephone: CITy 2847 · Telegrams: "Toledoro Cent London"

# Versatility with Economy!

**TWO IMPORTANT ADDITIONS NOW FIRMLY ESTABLISHED IN THE FAMOUS ELLIOTT-VICTORIA MILLING MACHINE RANGE**



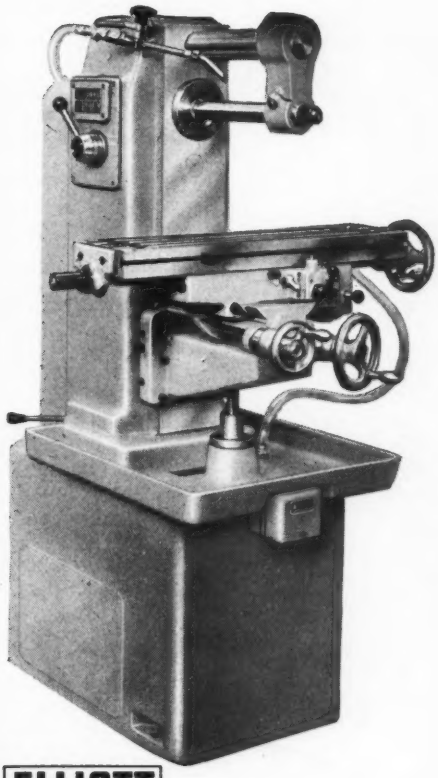
ELLIOTT VICTORIA

## junior-OMNIMIL

- Ideally suited to small jig, tool, die and fixture work.
- 7 Vertical spindle speeds 200 - 3,600 r.p.m. Vertical head motor ¾ h.p.

**On Both Machines**

- 8 horizontal spindle speeds 100-1700 r.p.m.
- 6 table feeds .009", .018", .036", .0018", .0036", and .0072".



ELLIOTT VICTORIA

## juniormil

- Especially designed for economical and accurate milling of small components.
- Table size 28" x 7".
- Working surface 28" x 7".
- Spindle motor 1 h.p.

***Optical measuring equipment, dividing heads, slotting attachment and universal attachment available as extra equipment.***

Manufactured by:

**B. ELLIOTT (MACHINERY) LTD**

*(MEMBER of the B. ELLIOTT GROUP)*
VICTORIA WORKS · WILLESDEN · LONDON · N.W.10
*Tel: ELGAR 4050 (14 lines) Grams: Elliottens, Harles, London*
Overseas Subsidiaries CANADA · U.S.A. · AUSTRALIA · S. AFRICA

ELLIOTT OF LONDON GROUP

# Unbeatable

Sanderson's have test plant constructed and designed to impose stresses on their hacksaw blades far exceeding the most severe duty met within the field ensuring high quality and consistent performance of all standard products.

**KERAUNOS** and **PAX**

HIGH SPEED STEEL & LOW TUNGSTEN

**HACKSAW BLADES**

*Write for your copy of our new helpful booklet "What you should know about Hacksaw Blades" and see how you can effectively improve production and reduce machining costs by using KERAUNOS High Speed and PAX Low Tungsten Hacksaw Blades*

SANDERSON BROTHERS AND NEWBOULD LIMITED

*Attercliffe Steelworks, P.O. Box 6,*

*Newhall Road, Sheffield 9*

# 'Maranyl' helps to make smooth work of egg breaking

*'Clean Track' Overhead Conveyor supplied by Messrs. Stewart Gill & Co. Ltd., 163 Bath Road, Slough, Bucks, and fitted with rollers moulded from 'Maranyl' I.C.I. nylon by Messrs. Punfield and Barstow (Mouldings) Ltd., Basil Works, Westmoreland Road, Queensbury, London, N.W.9, in operation at a modern egg breaking plant. This plant is operated by Messrs. John Rannoch Ltd., at Haughley Park, near Stowmarket, Suffolk.*

This photograph shows part of an Egg Breaking Plan at Haughley Park—one of the most modern in the country. The eggs are brought to the breaking area, the liquid egg is carried to the bulking plant and the shells are removed to the disposal area by the hanging conveyors. These conveyors will always run smoothly and silently without lubrication, because they run on rollers made from 'Maranyl' I.C.I. nylon. The use of 'Maranyl' also simplifies the vital job of keeping the conveyor clinically clean.

*I.C.I. Technical Service and Development*

If you would like fuller information about the properties and uses of 'Maranyl', I.C.I. Plastics Division Technical Service and Development Department will be glad to help you.

**'Maranyl'**

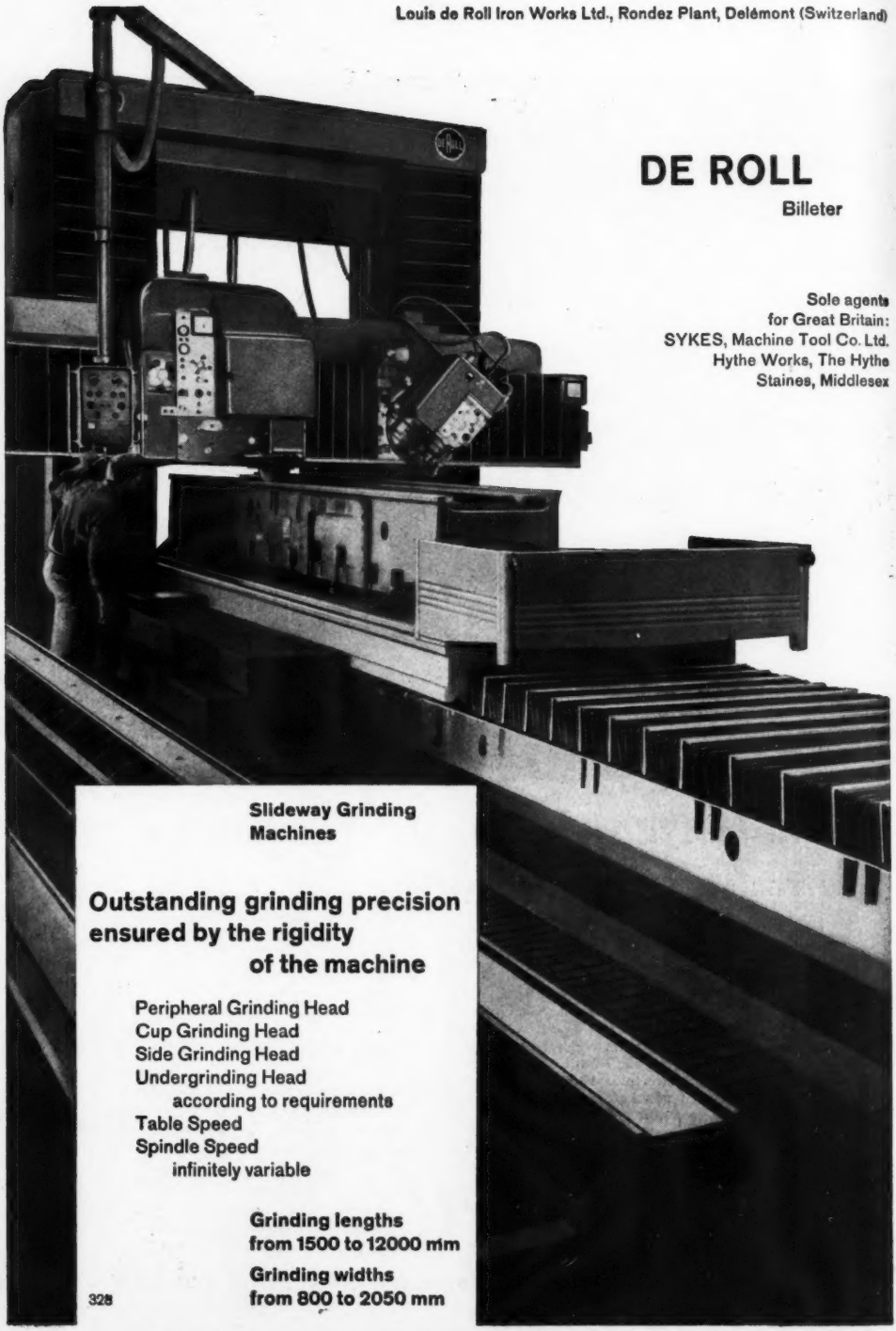
*'Maranyl' is the registered trade mark for the nylon compounds manufactured by I.C.I.*

ICI

IMPERIAL CHEMICAL INDUSTRIES LIMITED • LONDON • S.W.1

PN164

Louis de Roll Iron Works Ltd., Rondez Plant, Delémont (Switzerland)



# DE ROLL

Billeter

Sole agents
for Great Britain:
SYKES, Machine Tool Co. Ltd.
Hythe Works, The Hythe
Staines, Middlesex

Slideway Grinding Machines

**Outstanding grinding precision ensured by the rigidity of the machine**

Peripheral Grinding Head
Cup Grinding Head
Side Grinding Head
Undergrinding Head
according to requirements
Table Speed
Spindle Speed
infinitely variable

Grinding lengths
from 1500 to 12000 mm

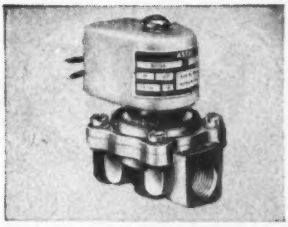
Grinding widths
from 800 to 2050 mm

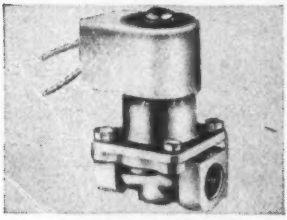
328

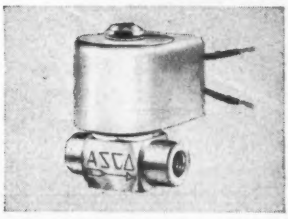
*When answering advertisements kindly mention MACHINERY.*

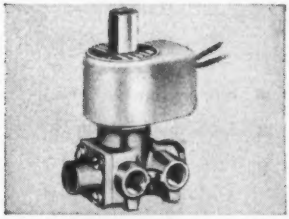
*Introducing*

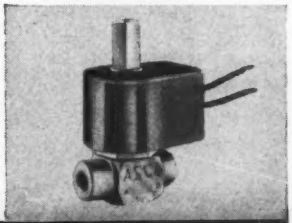
# the World's most dependable SOLENOID VALVE











The world's most dependable Solenoid Valve manufactured under exclusive licence from the Automatic Switch Company of New Jersey U.S.A., by Dewrance & Co. Ltd.
To be known in Britain as Dewrance Asco, the full range covers every conceivable aspect of the Engineering Industry.

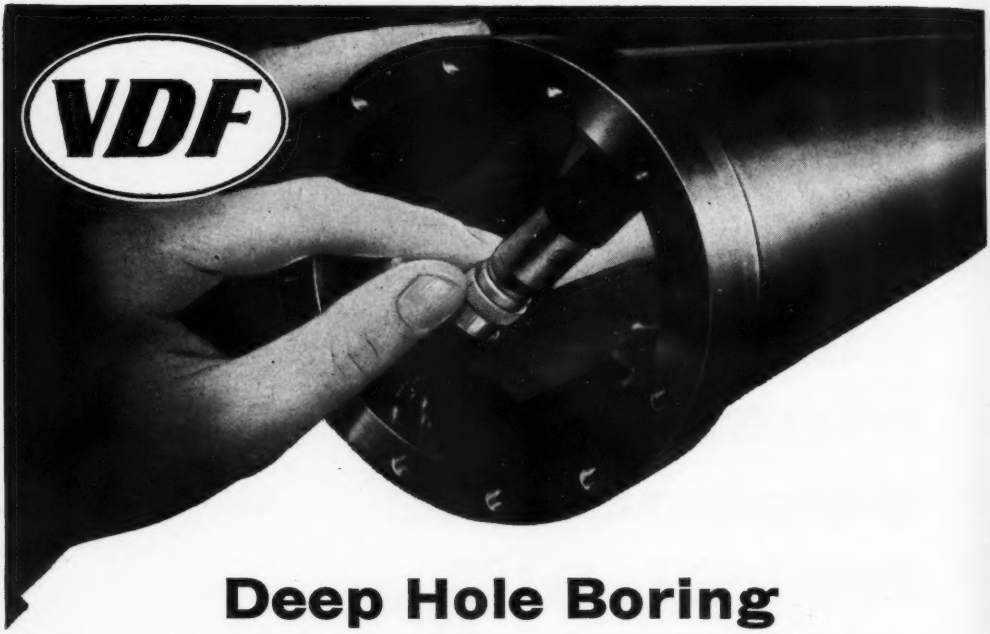
Complete technical details are freely available together with advice and recommendation on all control problems.

*Dewrance Asco Solenoid Valves are available for immediate delivery at the right price.*

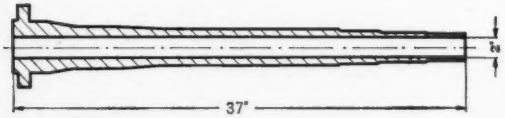
# DEWRANCE

ASCO®

**DEWRANCE & CO. LTD. GREAT DOVER STREET, LONDON, S.E.1**
*Telephone: HOP 3100 (12 lines)*

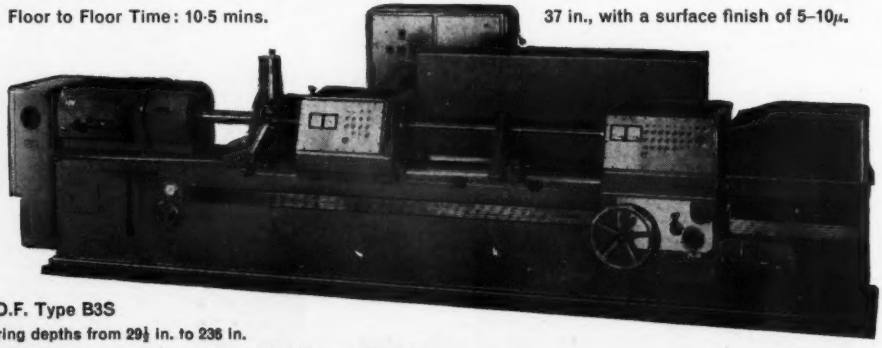



# Deep Hole Boring




- Spindle Speed: 710 R.P.M.
- Feed Rate: ·0063 in./rev. ■ Material: EN 9.
- Floor to Floor Time: 10·5 mins.

The work spindle illustrated is machined on a V.D.F. Deep Hole Boring Machine using the solid boring method and central chip disposal. The maximum axial deviation is ·0039 in. over the length of 37 in., with a surface finish of 5–10μ.



**V.D.F. Type B3S**
Boring depths from 29½ in. to 236 in.
Other models up to a maximum boring depth of 40 ft. and 16 in. dia.

SOLE BRITISH AGENTS
**SYKES MACHINE TOOL COMPANY LIMITED**
Hythe Works, The Hythe, Staines, Middlesex. *Telephone* Staines 55474 (5 lines) *Telegrams* Sytool Staines

KEEPING

# DANGER

## at a distance

That distance, whether it be governed by steel bars or wire mesh, can represent the difference between safety and serious injury. Machinery and tools—often running at high speeds—can be as productive of danger as any wild animal; and it is only good sense to cut this risk by using efficient and properly designed guards and fencing.

'Harco' Machinery Guards are purpose made for every type of machinery, and are constructed to afford complete protection without interfering with efficient operation. They are strongly made from stout wire mesh, and fully conform to Factory Act requirements.

The complete Harvey service covers advice, design and installation, and List No. 996 shows many types already supplied.

**'HARCO' MACHINERY GUARDS**

*Other HARVEY Facilities and Products:* PERFORATED METALS · WOVEN WIRE · WIREWORK OF ALL KINDS · GALVANIZING · STEEL SHELVING AND STORAGE BINS · BAR AND TUBE RACKS · FABRICATIONS IN ALL METALS · MACHINING AND FITTING

HARVEY

G. A. HARVEY & CO. (LONDON) LTD., WOOLWICH ROAD, LONDON, S.E.7

Telephone: GREenwich 3232 (22 lines)

WWB

LANG

# SURFACING & BORING LATHES
# model 26CB

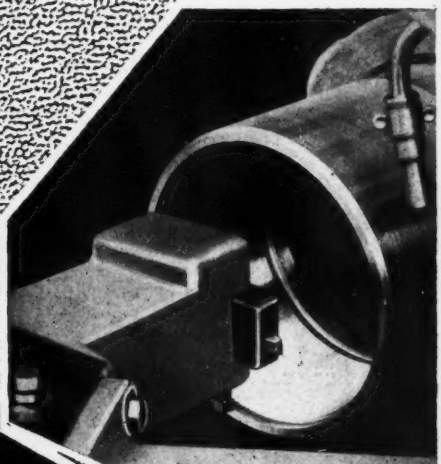
*modern design and powerful rigid construction*

**STANDARD EQUIPMENT**

Hexagon turret and slide.
Set of tool holders comprising:
1–Single-tool angular type.
2–Three-tool type.
1–Four-tool type.
1–No. 4 morse drill socket.
1–Sample boring bar.
Independent 4 jaw chuck.
Chuck guard.
Chip tray.
Chip guard at rear of lathe.
Automatic stops for surfacing feeds.
Foundation bolts, levelling screws, plates and wedges.

**FEATURES**

The bed is angled toward the rear for easy chip dispersal and the bed slideways are completely covered by a stainless steel guard.
Three high precision pre-loaded Gamet taper roller bearings support the spindle giving maximum rigidity under cutting loads.
Direct reading dials for cutting speeds, 24 spindle speeds and 60 feeds.
Clutches and brake are hydraulically actuated and do not require adjustment for wear.
Automatic lubrication to fasthead, gear-box, apron and bed-ways.
Hardened strips under the saddle to minimise bed-wear.
Removable centre stop on saddle allows the turret to move beyond the centre of the lathe, making possible the use of maximum size boring bars.
Turret location by long rectangular plunger. Location face at maximum radius ensuring very accurate indexing.
The turret will repeat to ·0008" (0·02 mm) at the end of a 8" (203 mm) long bar.
The turret can be supplied completely tooled up to suit clients requirements.



Screwing A.P.I. Round Form Internal 8 Threads per inch. 9½" taper bore.

| | | |
|---|---|---|
| Swing over bed | 32" | 813 mm. |
| Swing over saddle | 16" | 406 mm. |
| Admits in front of chuck: | | |
| with minimum bed length | 26" | 660 mm. |
| with maximum bed length | 44" | 1118 mm. |
| Hole in spindle | 4" | 102 mm. |
| Diameter of chuck | 24" | 610 mm. |
| 24 spindle speeds (forward and reverse) | 6·5 to 684 r.p.m. | 6·5 to 684 r/m. |
| 60 longitudinal and surfacing normal feeds | ·105" to ·0017" | 2·67 to ·044 mm. |
| 60 fine feeds at 8 highest spindle speeds | ·033" to ·0005" | ·84 to ·014 mm. |
| Diameter of spindle flange. (British Standard) | 14½" | 362 mm. |
| Travel of cross slide | 17" | 432 mm. |
| Holes in turret | 2½" | 63 mm. |
| Size across turret flats | 14" | 356 mm. |
| Tool section | 1" × 1½" | 25 × 38 mm. |
| Horsepower required | 20 | 15 Kw. |
| Net weight (minimum bed length) | 95 cwt. | 4826 Kg. |
| Nett weight (maximum bed length) | 105 cwt. | 5334 Kg. |

**JOHN LANG & SONS LTD.**
JOHNSTONE RENFREWSHIRE SCOTLAND
*Telephone: Johnstone 400 Telegrams: "Lang Johnstone"*

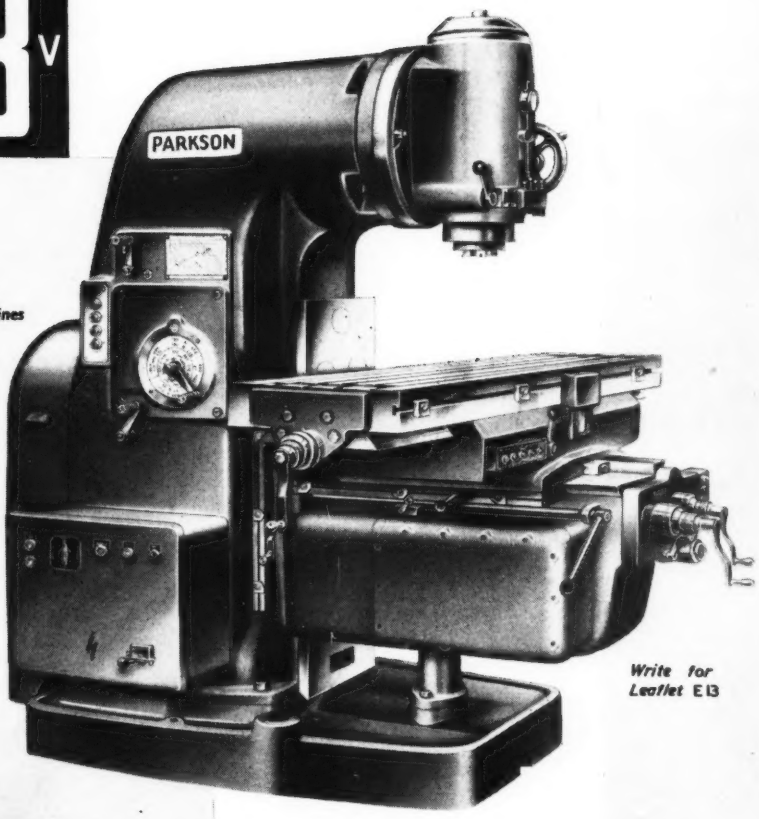
LONDON OFFICE
ASSOCIATED BRITISH MACHINE TOOL MAKERS LIMITED
17 GROSVENOR GARDENS SW1

L226M

May

# INTRODUCING THE

No. 3V




*Range of*
**PARKSON**
*Horizontal Milling Machines*

**INA Universal**
**2N Universal**
**2N Plain**
**3N Universal**
**3N Plain**
**Adapta Model N**

*Write for Leaflet* E13

**Table working surface : 70 in. x 16½ in.**
**Spindle nose to table : max: 22 in. min: 0**
**Spindle Speeds (28) in range selected : 17-1000 rpm or 22-1330 rpm or 25-1500 rpm**

# VERTICAL MILLER

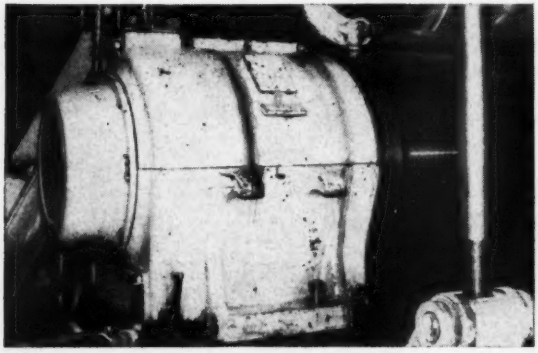
J. PARKINSON & SON (SHIPLEY) LIMITED
SHIPLEY · YORKSHIRE · ENGLAND
TELEPHONE SHIPLEY 53231

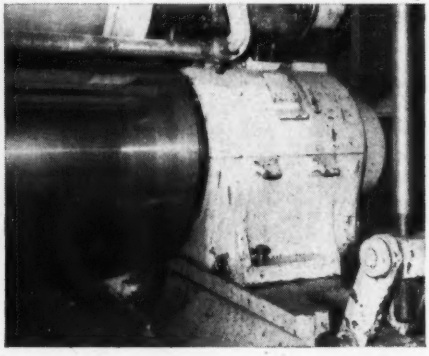
P385

**MILLERS' OILS**

JOHN W. MILLER & SON LTD.
Brighouse · Yorkshire · England
Tel : Brighouse 1047 (3 lines)

NEWS SHEET





# Major shutdown in paper mill prevented

## BLACK-MOLY

### KEEPS MASSIVE "SUPERCALENDER" GOING

Due to Heavy load and mishap whereby water entered the oil system supplying two white-metal bearings, 15″ in diameter, 17½″ long, carrying the bottom roll on a Supercalender, a hot bearing developed and the white metal "ran". Total loading on each bearing was 77,200 lbs.

A shut-down of this key piece of equipment was not acceptable, so the burnt metal was scraped away and sludge-ways cleared. After 12 hours running-in lightly loaded, the bearing was still very hot and after applying normal loading, droplets of molten white metal were thrown off.

Claims for BLACK-MOLY A.A. were remembered and in a "nothing to lose" chance, neat "A.A." was poured onto the journal and ½ gallon added to the oiling system. On applying load, no extra heating-up was noticed. A greaser stood by adding a few drops of "A.A." every few minutes. After six hours running the bearings had cooled down considerably, and after twenty eight hours the bearing temperature was normal.

**This bearing ran successfully for many weeks, thus avoiding a major shut-down at a busy period.**

*Extracts from letter received from:—*
Messrs. Brookgate Industries Ltd., Larkfield, Kent
(Member of the Reed Paper Group)

POST THIS COUPON FOR FULL DETAILS OF BLACK-MOLY

To: JOHN MILLER & SON LTD · BRIGHOUSE · YORKSHIRE

*WITHOUT OBLIGATION send me further details of BLACK-MOLY Cutting Fluids / ask your representative to arrange an appointment**

Name .....
Company .....
Address .....
.....
Telephone .....
Position in Firm ..... M.I.
**Delete as required.*

**BLACK-MOLY**
is the registered trade mark of
**JOHN MILLER & SON LTD**
BRIGHOUSE · YORKSHIRE · ENGLAND

# OPTICAL DIVIDING HEAD

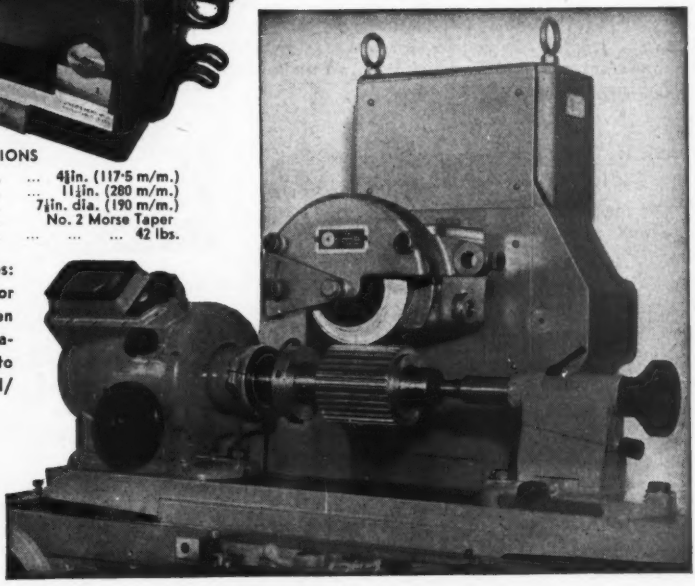
O.D.H. MOUNTED ON SINE TABLE

***COMBINING HIGHEST PRECISION WITH ROBUST CONSTRUCTION***

MAIN DIMENSIONS

| | |
|---|---|
| Height of Centres ... ... ... | 4½in. (117·5 m/m.) |
| Centre Distance (on Base) ... ... | 11in. (280 m/m.) |
| Size of Face Plates ... ... | 7½in. dia. (190 m/m.) |
| Size of Centres ... ... ... | No. 2 Morse Taper |
| WEIGHT OF HEAD ... ... ... ... ... | 42 lbs. |

Combining the following features: Dead centre, adjustable drive for zero settings, large vernier screen reading direct to 6 secs. (estimation 3 secs.) and conforms to N.P.L. Specification MOY/SCMI/56. Patent 599708.



O.D.H. MOUNTED ON JONES & SHIPMAN 540 GRINDING MACHINE, CONTROLLING SERRATIONS HELD TO A TOLERANCE OF 0·0002in. BOTH FOR SPACING AND DIAMETER

**PRECISION GRINDING LTD**

MILL GREEN ROAD · MITCHAM · SURREY Phone: MITCHAM 3014

NRP 1632

# Leytool 2-inch Stroke Slotting Machine

## KEENER PRODUCTION TIMES!

THE Leytool Slotting Machine is a development of necessity to provide economic manufacture of the 1001 small parts which no other machine can handle. So successful was this machine in their own works that the designers, The Leytonstone Jig and Tool Company, have now developed it to play an invaluable part in both small and large machine shops.

Sturdy, well-built and comprehensive in its uses on production machining of small parts, this machine has accuracy, adaptability and unique features of the greatest possible value in the toolroom.

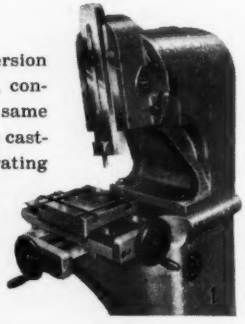
A "great" little machine which in initial cost, production time and trouble-free service offers a 25% overall saving in manufacturing costs of any part within its considerable range of uses.

25% Saving

**MARK II**

This is a simplified version of the Mark 1 model, constructed from the same heavily designed main castings, but not incorporating the Rotary Table.

The two cross slides are hand fed only and the 7" x 6½" rectangular Tee Slotted Table is designed primarily to accommodate producting tooling.



**MARK I**

This model is fitted with a very serviceable 7in. diameter Rotary Table, which has been specially hardened, ground and graduated. Rapid, precise setting to within 1/1000th of an inch is provided by the accurately ground centre bore and tenon slots.

***Designers and Manufacturers: The Leytonstone Jig and Tool Co. Ltd.***

***Please write for full details to***
**SOLE DISTRIBUTORS:**

Gordon Try Ltd.

**THE CAUSEWAY, EGHAM, SURREY**

**Telephone: EGHAM 4166-7**

Wickman

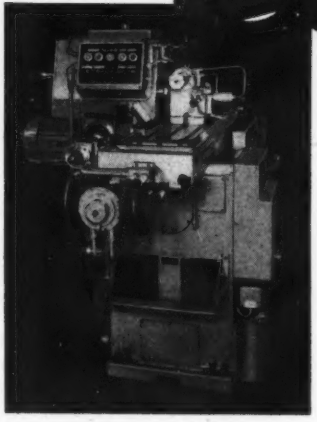
Announce with pleasure their sole agency for . . . . . Kopp

# Profile Milling and Grinding

## AUTOMATICS

**(Two and three-dimensional)**

*Photographs by courtesy of B.S.A. Guns Ltd.*



The Kopp range of profile milling and grinding machines operates on the co-ordinate principle, table and spindle movements being operated by tracer-controlled hydraulic valves.

They are particularly noteworthy for their simplicity in setting-up and are, therefore, suitable for small batch work, as well as continuous production.

Machines can be supplied with single or double-spindles for the rapid production of keyways, slots, internal and external profiles and cams of any kind in one operation.

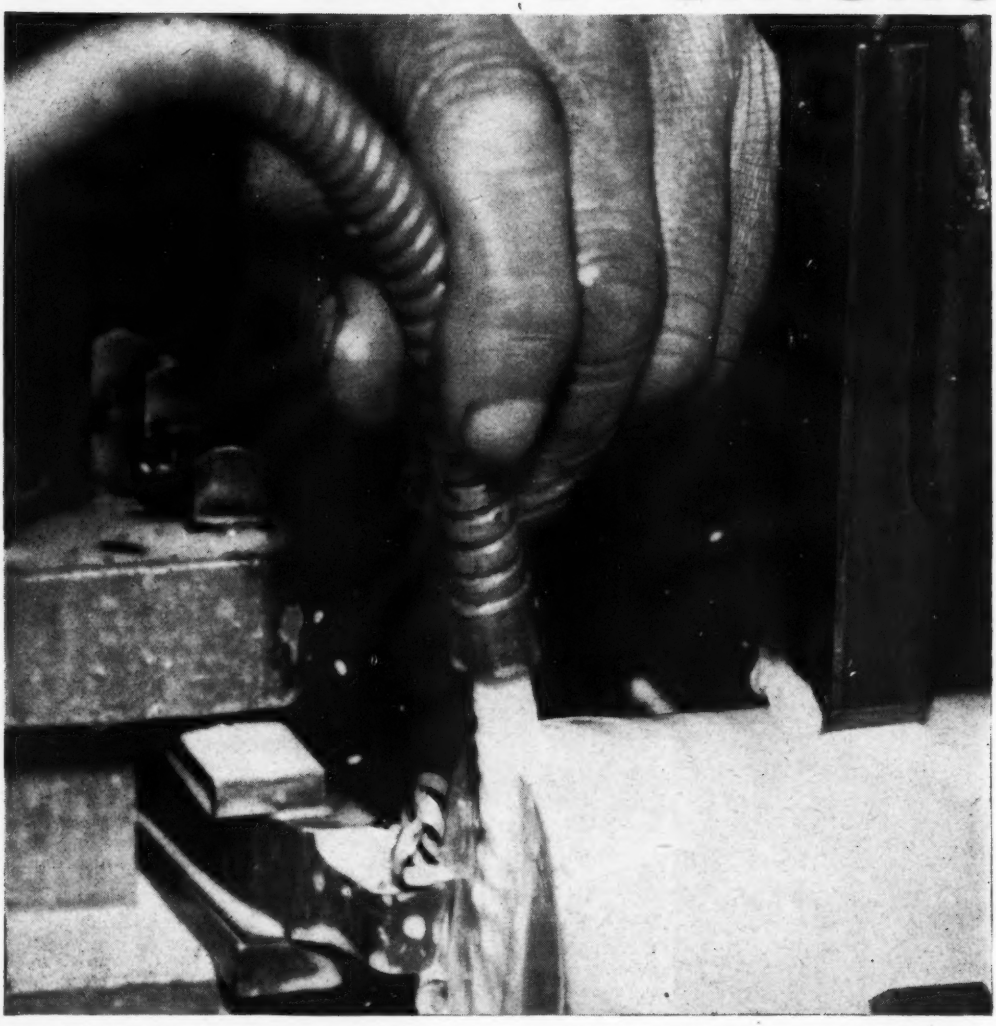
WICKMAN Wickman LIMITED

FACTORED MACHINE TOOL DIVISION, BANNER LANE, COVENTRY

F.579

*Telephone: Tile Hill 65231*

# Shell achievement



One of Shell's recent achievements in Industrial Lubrication has been to reduce the risk of skin trouble for machine operators. Until the new Shell Dromus range, most modern soluble cutting oils contained phenolic compounds, which can cause skin irritation. They were used as coupling agents between the actual oil and the emulsifier. On high-speed machines, especially, the water evaporates and the emulsion concentrates. And that's when the trouble can start. Shell scientists found a better coupling agent, and made it work. And now, at no extra cost, management can reduce working risks for their staff. *Write for the book, 'Selecting Your Cutting Oils', to Shell-Mex House, London.*

SHELL

# SHELL INDUSTRIAL OILS

*When answering advertisements kindly mention MACHINERY.*

# Shell demonstration

Two clean, bright pennies are placed in beakers of oil, of equal performance level, one Shell Garia Oil 21, the other a conventional cutting oil containing sulphurised additives. After three hours at room temperature one penny is still bright and stain-free, the other heavily stained with black copper sulphide. The bright penny is from the beaker containing Shell Garia Oil 21, the blackened one from that containing the conventional oil. While these were just pennies they could have been bronze bushes in your machine tools—stained in less than half a shift. Sulphur is essential in heavy-duty cutting oils. Special additives in Shell Cutting Oils protect your machine tools and yet allow the sulphur to do its job.

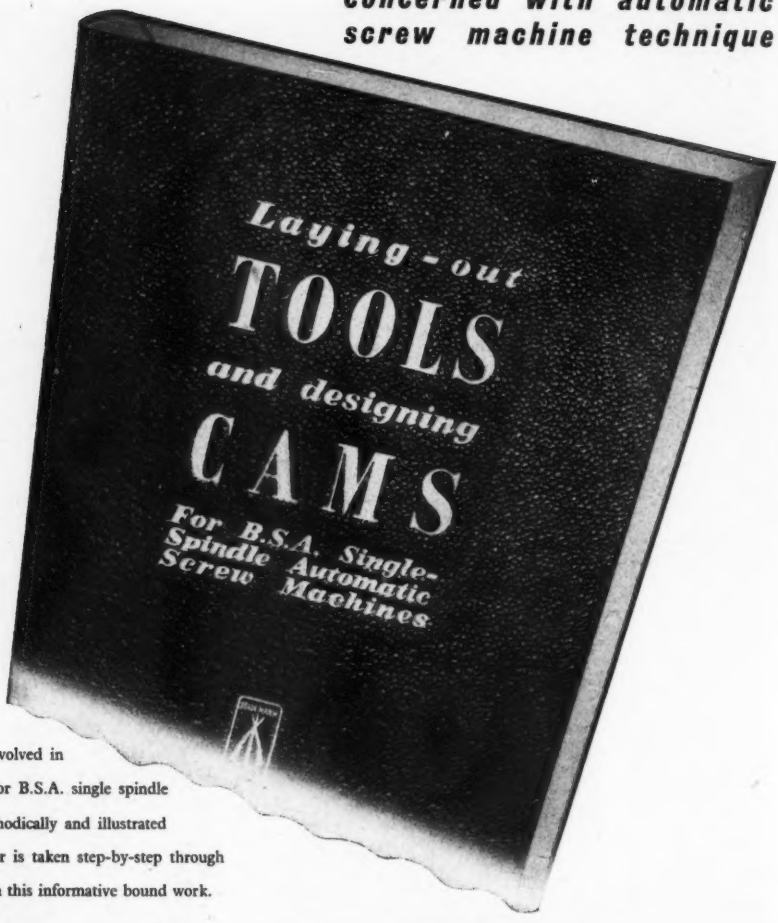
*Write for the book "Selecting Your Cutting Oils" to Lubricants Department, Shell-Mex House, London, W.C.2.*

DROMUS . . . PELLA . . . MACRON . . . GARIA

SHELL

# SHELL CUTTING OILS

***A comprehensive reference for designers, engineers and all concerned with automatic screw machine technique***




Procedure and calculations involved in cam design and tool layout for B.S.A. single spindle automatics are described methodically and illustrated diagrammatically as the reader is taken step-by-step through typical production examples in this informative bound work.

Tables of Cutting Speeds and Feeds, Cycle Times and Change Gears, Revolutions per Cycle, Conversion and Screw Threads are provided, together with machine and attachment specification and capacity charts.

Compiled by B.S.A. Tools Ltd., the book has 124 pages, 11" x 8½", and is obtainable only from the company at the nominal sum of 10s. 6d., post free. Please order by sending the coupon (or by writing) to :

**B.S.A. TOOLS LTD.**

**KITTS GREEN, BIRMINGHAM 33**
**Tel. STECHFORD 3071**

**To B.S.A. TOOLS LIMITED**
**KITTS GREEN, BIRMINGHAM 33**
*(Note: Requests from abroad preferred in writing)*

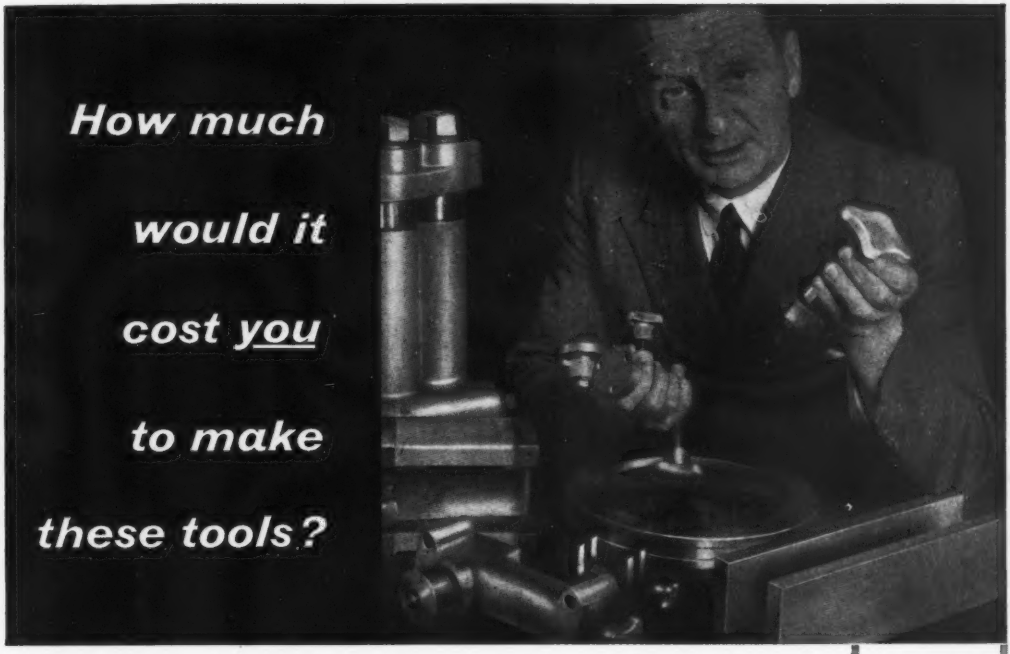
*Please send me/us .....copies of bound book "Laying-out Tools and Designing Cams for B.S.A. Single Spindle Automatics", 10s. 6d. per copy, post free. I/we enclose..... for £ : : in payment.*

**NAME** .....

**ADDRESS** .....

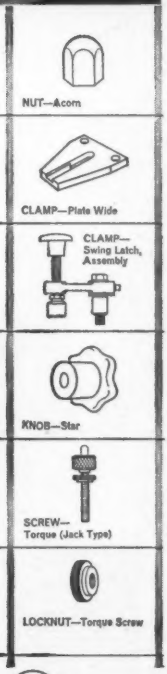
.....

**DATE** 488

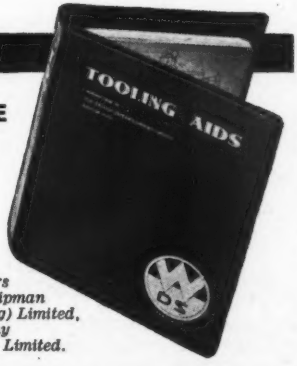



# ...WE CAN SUPPLY THEM AT A FRACTION OF THE COST—within days!

Did you know that many of the jigs and tools prepared at great expense by your most skilled men can be assembled from high quality standard components supplied by Woodside? The fast-growing range already includes 30 basic tooling accessories in 300 individual forms, each available in numerous sizes. In today's competitive conditions, speed of re-tooling is often a decisive factor. Most WDS Tooling Aids are immediately obtainable from stock. The remainder can be supplied within days.




## Tool up the Woodside way




**SEND FOR THIS CATALOGUE OF TOOLING AIDS ▶**

A glance through the list of standard items in the WDS Tooling Aids catalogue will show how you can cut costs and save time in the drawing office and at the bench.

THESE FIRMS FIND IT PAYS TO USE WDS TOOLING AIDS:
*Handley Page (Reading) Limited, Humber Limited, Jaguar Cars Limited, Morphy-Richards (Ctay) Limited, A. A. Jones and Shipman Limited, The National Cash Register Company (Manufacturing) Limited, Peto Scott Electrical Instruments Limited, The Pyrene Company Limited, Simplex Electric Company Limited, Westland Aircraft Limited.*

## THE BRITISH OXYGEN COMPANY LIMITED

WOODSIDE WORKS, NEWLAY, LEEDS 13. Tel: Horsforth 4251/5. Telegrams: Wooddie Leeds, Telex 55185 TGA WOIE

# MACHINE TOOL DIRECTORY

**AUTOMATICS**
MANURHIN Single Spindle machines.
Manuf. De Machines Du Haut-Rhin
France.....Sotama S.A., Switzerland
NASSOVIA-LINSTEDT Vert. Rotary
Chuck Autos. and Univ. Drum Autos.
NASSOVIA Werkzeugmaschinenfabrik
G.m.b.H. Germany.
Single spindle Automatics.
WARNER SWASEY ASQUITH LTD:
Halifax
Single spindle and multi-spindle Bar and Chucking Autos.
WARNER & SWASEY.....U.S.A.

**BALANCING MACHINES**
DY-NAMIC machines.
BEAR Manufacturing Co.....U.S.A.

**BORING MACHINES, Fine**
Single and Multi-spindle machines.
Ernst KRAUSE & Co.....Austria

**BORING MACHINES**
**Horizontal, Floor**
Traversing Column machines with spindle diameters up to 10in.
William ASQUITH Ltd.....Halifax

**BORING MACHINES**
**Horizontal Table Type**
William ASQUITH Ltd.....Halifax

**BROACHING MACHINES**
HI-TON Machine Tools Ltd., Birmingham

**CENTRING AND FACING MACHINE**
HI-TON Machine Tools Ltd., Birmingham

**DIE SINKING MACHINES**
BLACKBURN Aircraft Ltd.....Brough
NASSOVIA Werkzeugmaschinenfabrik
G.m.b.H. Germany.

**DRILLING MACHINES**
**Radial, Vertical and Multi-spindle**
Wide range of size and capacities.
William ASQUITH Ltd.....Halifax

**GEAR HOBBING MACHINES**
DRUMMOND Bros. Ltd.....Guildford
GOULD & EBERHARDT.....U.S.A.

**GEAR SHAPING MACHINES**
MAXICUT machines for high speed and heavy duty.
DRUMMOND Bros. Ltd.....Guildford

**GEAR TESTING MACHINES**
WADTOOL Production testers.
WADDINGTON TOOLS Ltd.
Wolverhampton

**GRINDERS, Projection Form**
PETEWE .....Germany

**GRINDING MACHINES**
**Centreless**
LIDKOPING ..... Sweden

**GRINDING MACHINES**
**Cylindrical and Universal**
Also Crankshaft and Thread Grinders
MSO Werke ..... Germany

**GRINDING MACHINES**
**Internal**
U.V.A. ..... Sweden

**SURFACE GRINDING MACHINES**
SNOW & Co. Ltd.....Sheffield

**HONING MACHINES**
GEHRING G.m.b.H.....Germany

**INDUSTRIAL WASHING MACHINES**
For every need from bolts to buses.
DAWSON Bros. Ltd.....Leeds

**JIG BORING MACHINES**
MSO Werke.....Germany

**KEYSEATING MACHINES**
Oswald FORST G.m.b.H.....Germany

**LATHES, Centre**
George SWIFT & Sons Ltd.....Halifax
COLCHESTER Lathe Co. Ltd.....Colchester
H.E.B. .....France

**LATHES, Copying**
MAXIPILOT Hydraulic high-production machines.
DRUMMOND Bros. Ltd.....Guildford
H.E.B. Universal Copying Lathes.
H.E.B. .....France

**LATHES, Heavy Duty**
George SWIFT & Sons Ltd.....Halifax
DEUTSCHLAND G.m.b.H.....Germany

**LATHES, Multi-Tool**
MAXICUT Automatic High-Production machines.
DRUMMOND Bros. Ltd.....Guildford

**LATHES, Roll Turning**
George SWIFT & Sons Ltd.....Halifax
DEUTSCHLAND G.m.b.H.....Germany

**LATHES**
**Surfacing and Boring**
George SWIFT & Sons Ltd.....Halifax

**LATHES, Turret**
Wide range for bar and chuck work.
WARNER & SWASEY.....U.S.A.

**LATHES, Wheel**
DEUTSCHLAND G.m.b.H.....Germany

**MILLING MACHINES**
**Horizontal and Vertical**
Reinhard BOHLE K.G.....Germany

**PLANING MACHINES**
with oil-hydraulic table operations.
Adolf WALDRICH Coburg K.G., Germany

**PRESSES, Hydraulic**
HI-TON machines from 1 to 300 tons.
HI-TON Machine Tools Ltd., Birmingham

**RIVETING MACHINES**
HI-TON Machine Tools Ltd., Birmingham

**SAWING MACHINES, Cold**
Hydraulic high-production machines.
J. F. OHLER.....Germany

**SAW SHARPENING MACHINES**
J. F. OHLER.....Germany

**SLOTTING MACHINES**
Hydraulic heavy duty machines.
Adolf WALDRICH Coburg K.G., Germany

**TAPPING UNITS**
William ASQUITH Ltd.....Halifax

**MATERIALS TESTING EQUIPMENT**
Otto WOLPERT Werke G.m.b.H.,
Germany

**THREAD CUTTING MACHINES**
High Speed Thread Peeling Machines.
Adolf WALDRICH Coburg K.G., Germany

**THREAD ROLLING MACHINES**
PITCHMASTER for high tensile steel.
HI-TON Machine Tools Ltd., Birmingham

**TRANSFER MACHINES**
Complete installations for mass production needs.
William ASQUITH Ltd.....Halifax

**TUBE BENDING MACHINES**
STAFFA machines for quantity production.
CHAMBERLAIN INDUSTRIES Ltd.,
London

**VERTICAL TURNING AND BORING MILLS**
JUNGENTHAL ..... Germany

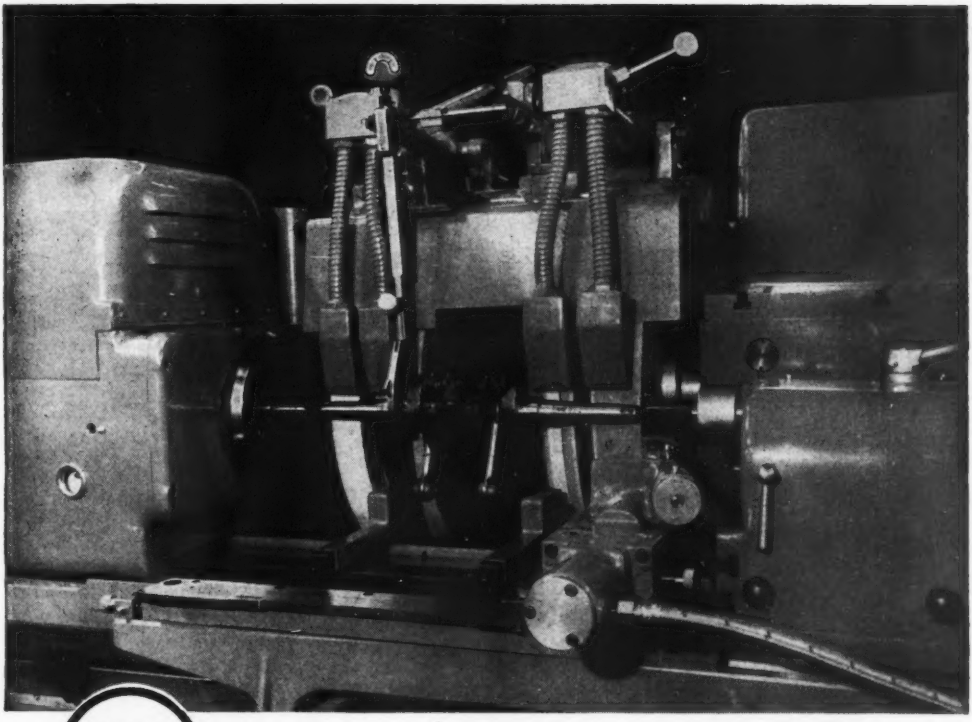
**Write today for further details on any of the above mentioned machines in which you are interested.**

Sales and Service for the British Isles

**DRUMMOND-ASQUITH LIMITED**

Member of the Asquith Machine Tool Corporation

KING EDWARD HOUSE, NEW STREET, BIRMINGHAM Phone: Midland 3431 Also at LONDON Phone: Trafalgar 7224 and GLASGOW Phone: Central 0922

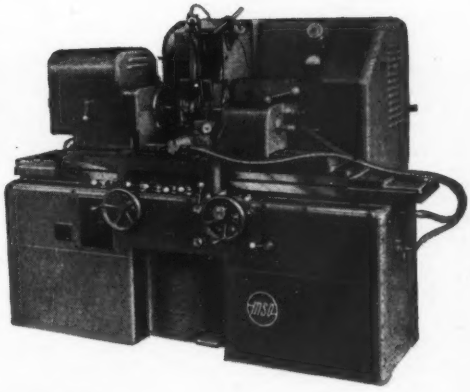


MSO **for rapid and accurate grinding of cylindrical, tapered and profile work**

MSO fully hydraulic semi-automatic production grinding machines, type FH, are extremely simple to operate. The automatic grinding cycle is controlled by a single lever and if required the " Precimatic " grinding gauge can be supplied to control sizing. An hydraulic form dressing attachment, seen clearly in the illustration above, is a further item of equipment of specific value when the profiling of grinding wheels is required.

The arrangement shown is for grinding the journals of a small automobile crankshaft, employing several profiled wheels.

These M.S.O. Type FH machines are built in a wide range of sizes for grinding by longitudinal or plunge-cut methods. Write today for details, mentioning the type and size of work in which you are interested.



*Sales and Service for the British Isles*

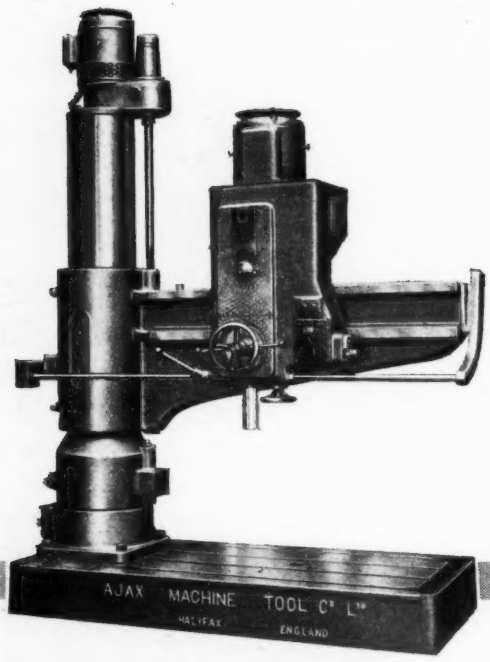
**DRUMMOND-ASQUITH LIMITED**

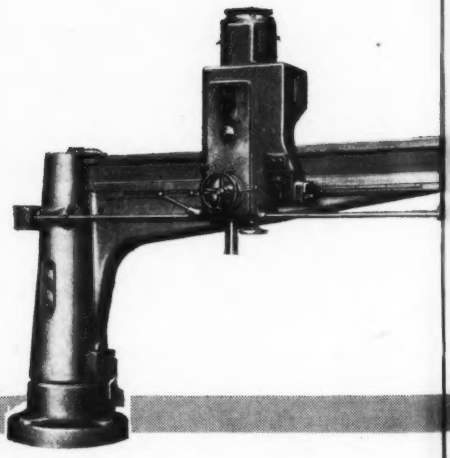
*Member of the Asquith Machine Tool Corporation*

KING EDWARD HOUSE, NEW ST., BIRMINGHAM *Phone: Midland 3431.* *Also at LONDON Phone: Trafalgar 7224 & GLASGOW Phone: Central 0922*

IF 294

# these AJAX radial drills ar(ir



**TYPE AJ4**
**Radial Drilling, Boring and Tapping Machine.**

Internal pillar type with full length sleeve. 3in. diameter drilling capacity in steel.

SIZES
4ft. 6in., 5ft. or 5ft. 6in. Spindle Radius.

**TYPE AJ31**
**Girder Radial Drilling and Tapping Machine.**

**CAPACITY**
Drilling in mild steel—3in. dia.
Four Automatic Spindle Feeds. Eight Spindle Speeds

SIZES
6ft., 7ft. or 8ft. Spindle Radius.

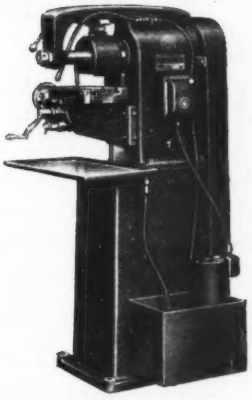
**AJAX MACHINE TOOL COMPANY LTD.** *Proprietors: Ada (Halifax) Ltd* WEST

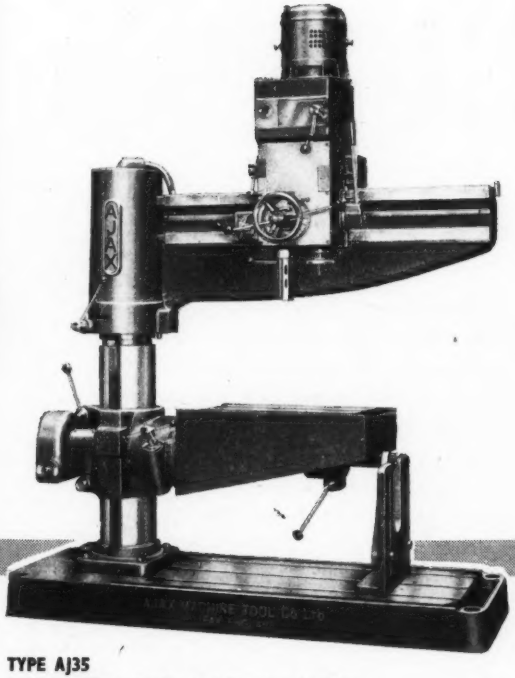
*When answering advertisements kindly mention MACHINERY.*

# in BIG demand

**TYPE AJ8**
**Motorised Hand Milling Machine**

Spindle centre to top of table max. 6¼in.
Spindle centre to underside of overarm 4¼in.
Column face to overarm bracket 8¼in.
Spindle nose to overarm bracket. 8¼in.





**TYPE AJ35**
**Radial Drilling, Boring and Tapping Machine.**

**CAPACITY**

Drilling 1½in. dia. in mild steel. 1¼in. dia. in cast iron.

SIZES

3ft. or 4ft. Spindle Radius.
Standard machine has hand elevation, machine illustrated has optional power elevation.

**POST THIS COUPON TODAY!**

to Ajax Machine Tool Co., Ltd., Halifax.

*Please send me full details of Ajax Machines.*

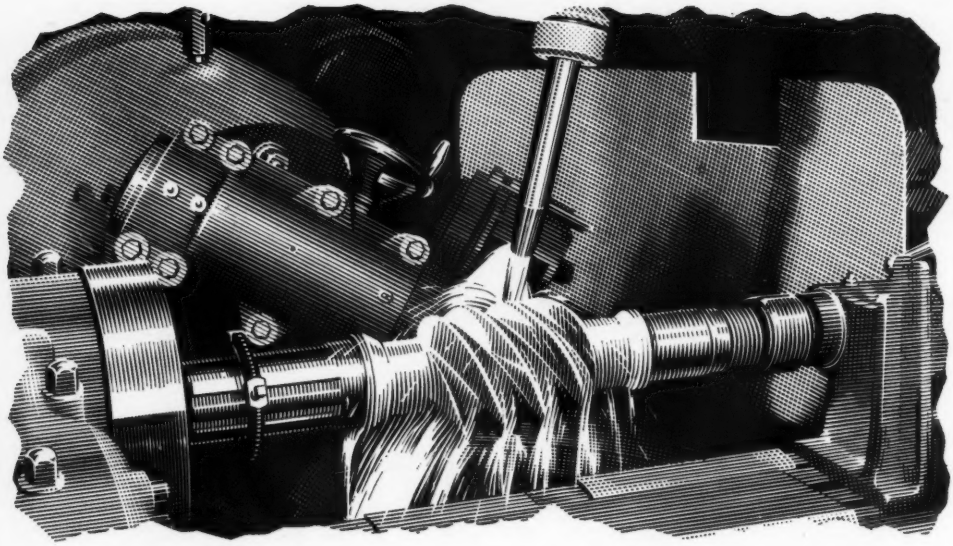
NAME_____

POSITION_____

FIRM_____

ADDRESS_____

**WEST MOUNT WORKS, HALIFAX, YORKSHIRE, ENGLAND.** Telephone 5395/9. Telegrams: Ajax, Halifax.



# How good is a cutting fluid?

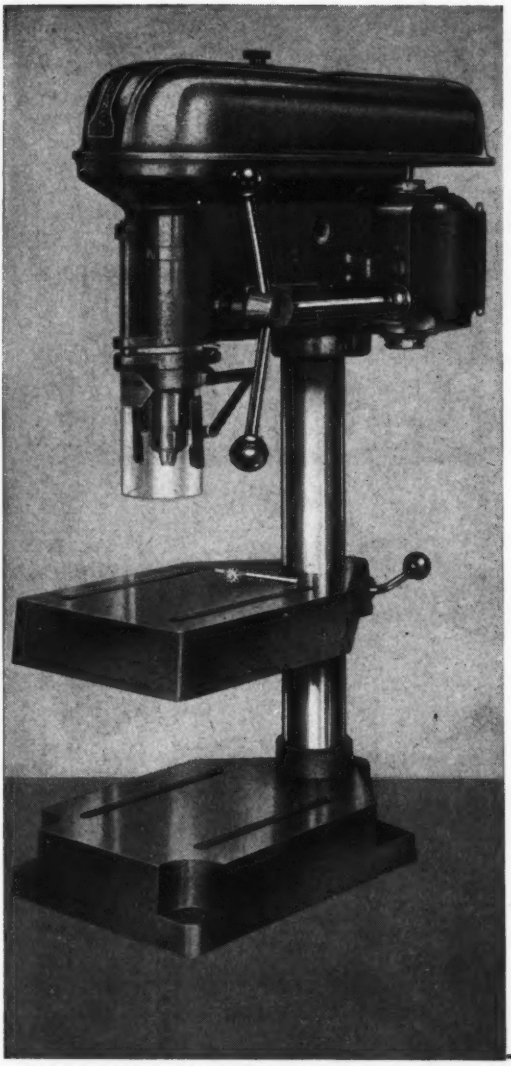
That's a very pertinent question to ask right at the start. Advisedly so, for we hold strong views about the part cutting fluids can and do play in the machining of metals. For far too many years, it has been pre-supposed that as long as you flooded the tool and workpiece with a fluid of some kind, things were bound to happen! Just what fluid seemed rather unimportant and one might be considered a niggler if one held a more rigid viewpoint. But have the bad old days really gone for good—the good of metal cutting that is? All too often, a tooling set-up gets every kind of intelligent consideration until it comes to the question of coolant. The nearest drum or central bulk supply may be alright but could be just the opposite. A cutting fluid has a major responsibility in the province of machining and forming metals and it is our fondest tenet that until you have the right oil on tap, you are missing the sort of production savings that Fletcher Miller users secure. After 45 years, we have a lot of accumulated know-how (sorry about that word) and just the right cutting fluid for any metal production job. Call in the experts.

*choose*

**FLETCHER MILLER** *cutting fluids*

FLETCHER MILLER LTD., HYDE, CHESHIRE
Telephone: HYDE 3471 (5 lines) Telegrams: EMULSION, HYDE

CF 138



# INCOMPARABLE IN PRICE & QUALITY

- Weight 154 lbs. 70 kgs.
- Five Spindle Speeds
- Throat Depth $7\frac{5}{8}$″ : 194 mm
- Column Diameter $2\frac{3}{4}$″ : 70 mm
- Quill Diameter 2″ : 50·8 mm
- Robust Spindle and Quill Assembly with splined spindle and driving sleeve
- Large working surface to table and base
- Adjustable Depth Stop and Spring-controlled Spindle return

Supplied complete with 0-½in. Chuck, 3 phase motor, rotary on/off starter. Pedestal model £2.15.0 Extra. Single phase electrics £2.10.0 Extra.

**£42**

DRILTRU MEDDINGS

**W. J. MEDDINGS LTD**
IPSWICH ROAD, TRADING ESTATE, SLOUGH, BUCKS.
*Telephone: Slough 26761* *Telegrams: Pacera Slough*

Obtainable from all leading Machine Tool Merchants, or write to us for details of your nearest stockist.

*When answering advertisements kindly mention MACHINERY.*

# NOVA MATIC B-ME

it's NEW
it's BIG

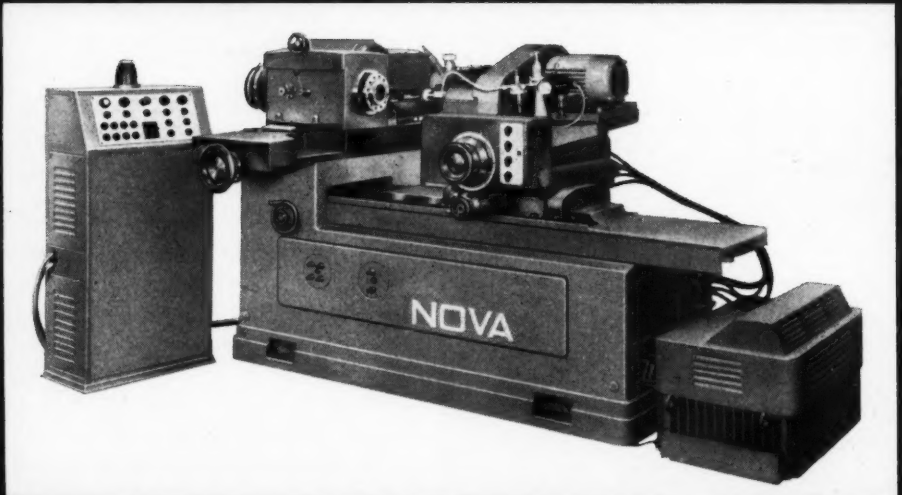
## INTERNAL GRINDING MACHINES

*Designed to meet the most exacting demands. Provides a higher standard of efficiency, accuracy and increased production*

**SPECIFICATIONS**

| | |
|---|---|
| Maximum internal dia. ground | 16" |
| Total cross movement of workhead | $12\frac{3}{8}$" |
| Maximum swing dia. of workhead with splash guard removed | 38" |

## LARGE DIAMETER GRINDING




- TABLE OSCILLATION ADJUSTABLE FROM 2 mm.
- ADJUSTABLE TABLE STOP
- FEED IMPULSE VARIABLE FROM 2 SECONDS – 25 SECONDS
- PLUNGE GRINDING
- ELECTRONIC SIZING
- MULTIPLE WHEEL DRESSING WITHIN AUTOMATIC CYCLE
- INFINITELY VARIABLE FEED
- INFINITELY VARIABLE WORK HEAD SPEED
- WHEEL BALANCE INDICATION
- AUTOMATIC WHEEL COMPENSATION

**FENTER**

*Write <u>now</u> for full details and illustrated literature to:—*

**FENTER MACHINE TOOLS LIMITED**

**184 ASTON ROAD · BIRMINGHAM 6**

*Telephone: ASTon Cross 1551-2-3*

*When answering advertisements kindly mention MACHINERY.*

THE
**MAN**
**ON THE JOB**
SAYS

*"Experience shows that when it comes to a perfect finish you've got to use the best Abrasive Cloth"*

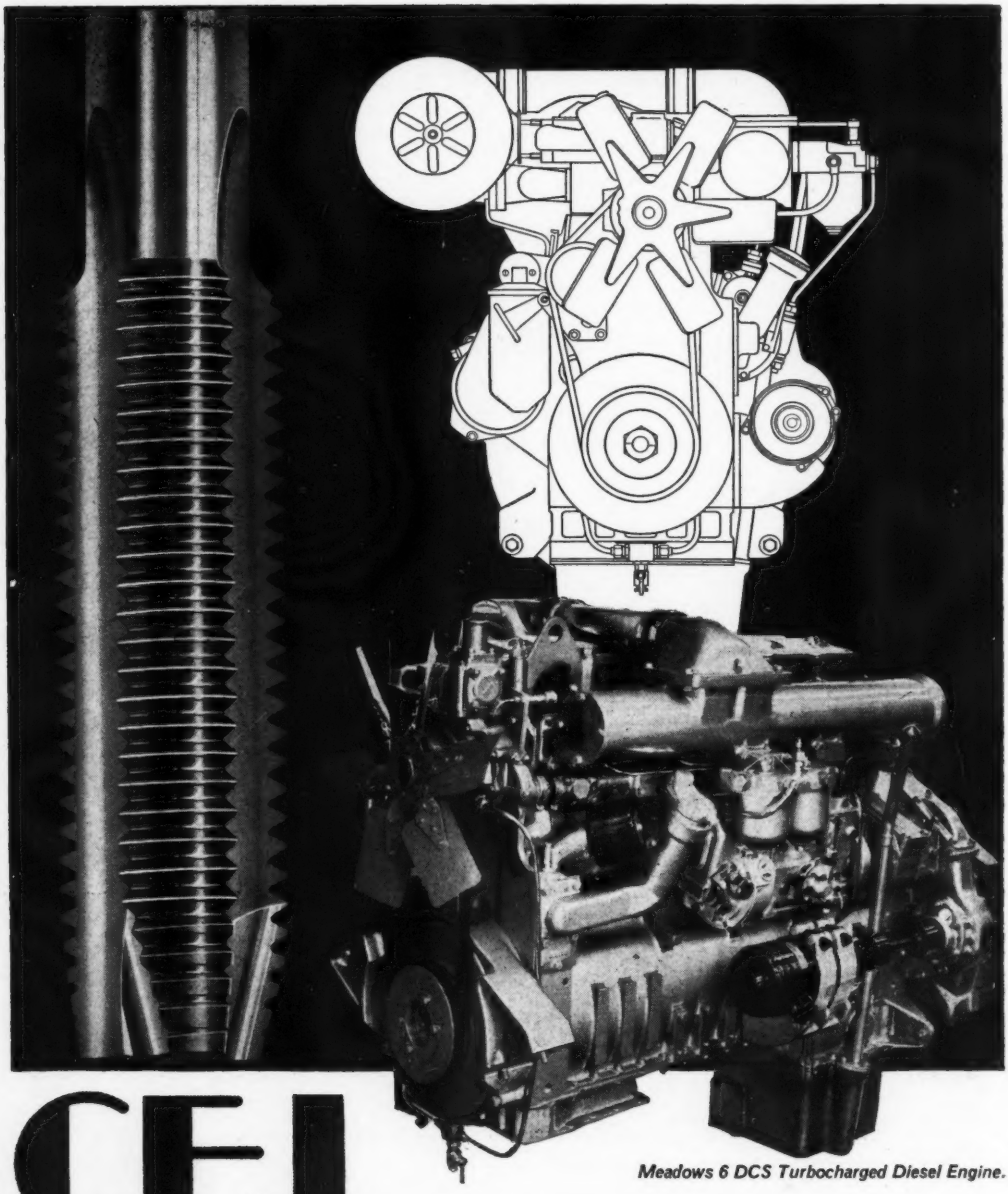
**COATED ABRASIVE PRODUCTS**
**FOR ALL METAL TRADES**

**OAKEY**

**IN BELTS · DISCS · SHEETS & COILS**

**JOHN OAKEY & SONS LTD · WELLINGTON MILLS · LONDON · S.E.1**

OA113



*Meadows 6 DCS Turbocharged Diesel Engine.*

# CEJ

## for Ground Thread Taps

C. E. JOHANSSON LTD. *Specialists in Threading and Precision Measurement*

*SOUTHFIELDS ROAD · DUNSTABLE · BEDS TELEPHONE: DUNSTABLE 62422*

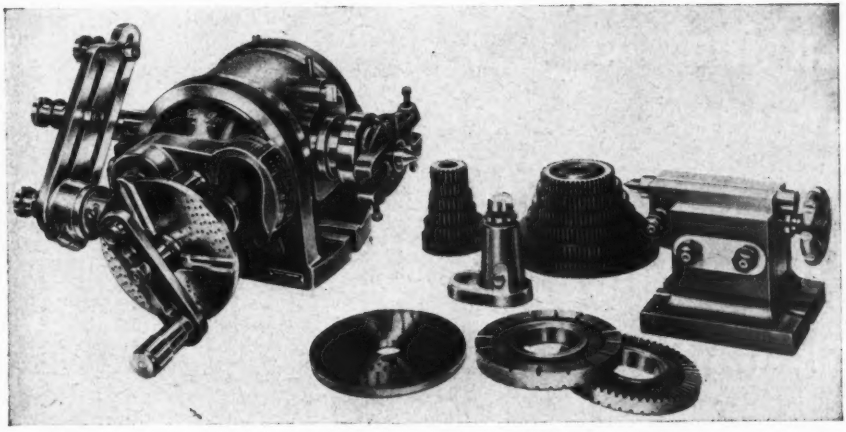
DHB 7373

# COS·PAR

HIGH PRECISION

## *UNIVERSAL DIVIDING HEADS*

MODEL ALFA



| SPECIFICATION | ALFA 1 | ALFA 2 | ALFA 4 | ALFA 5 | ALFA 7 | ALFA 9 |
|---|---|---|---|---|---|---|
| HEIGHT OF CENTRES ... ... ... | 4½" | 5½" | 5⅞" | 6½" | 7" | 7⅛" |
| BORE OF HOLLOW SPINDLE ... ... | ⅝" | 1⅛" | 1⅛" | 1⅛" | 1⅛" | 1⅛" |
| MORSE TAPER IN SPINDLE ... ... | No. 3 | No. 4 | No. 4 | No. 4 | No. 4 | No. 4 |
| MORSE TAPER IN TAILSTOCK... ... | No. 1 | No. 2 | No. 2 | No. 2 | No. 2 | No. 2 |
| DIVISION RATIO ... ... ... ... | 1 : 40 | 1 : 40 | 1 : 40 | 1 : 40 | 1 : 40 | 1 : 40 |
| DIVISIONS OBTAINABLE... ... ... | 2-400 | 2-400 | 2-400 | 2-400 | 2-400 | 2-400 |
| APPROXIMATE WEIGHT... ... ... | 114 lbs. | 161 lbs. | 255 lbs. | 260 lbs. | 270 lbs. | 280 lbs. |
| PRICE ... ... ... ... ... | £160 | £180 | £250 | £275 | £295 | £310 |

**SPECIAL TERMS TO MEMBERS OF B.A.M.T.M.**

HERBERT WIDDOWSON & SONS LIMITED
CANAL STREET WORKS NOTTINGHAM
TELEPHONE: 51891 (3 lines) TELEGRAMS: TOOLS NOTTINGHAM

# LUSCHER

*Made in the finest tradition of Swiss craftsmanship . . .*

## 4 wheel combination carbide tool grinding and lapping machine

**Specification**

| | |
|---|---|
| To take grinding & Lapping Wheels. | 6in. dia. |
| Power of main motor. | 1 h.p. |
| Size of inclinable table. | 24in. by 9¾in. |

*Attachments Available.* for Chip Breaker groove grinding, Nose radius grinding, twist drill grinding. Also oversize Table, Grinding Wheels, Lapping Wheels, Lighting equipment.

**Basic price £395** Special Terms for Members of B.A.M.T.M.

**HERBERT WIDDOWSON & SONS LIMITED**

**Canal Street Works Nottingham**

Tel: 51891 (3 lines) Grams: TOOLS NOTTINGHAM

**Superb performance**
**Attractive price**
**Quick delivery**

**All models complete with Standard Equipment including :**

- Cos-par Universal Dividing Head
- Vertical Milling Attachment
- Arbor
- Front Support Braces

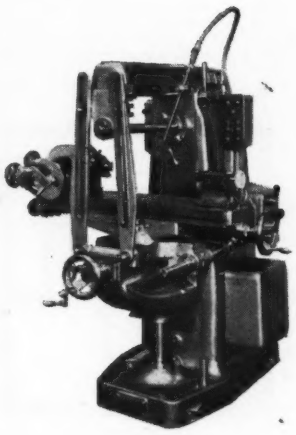
Specification :

| | 0 | 1 | 2 |
|---|---|---|---|
| Table | 34″ × 8¼″ | 39⅜″ × 9″ | 48″ × 11″ |
| Long. Trav. | 20″ | 26″ | 29″ |
| 12 Speeds | 32-1000 | 60-1200 | 40-2000 |
| Spindle Nose | No. 40 | No. 40 | No. 40 |
| PRICE ★ | £880 | £1100 | £1825 |

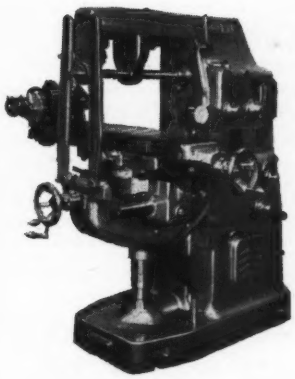
TEST

**UNIVERSAL MILLING MACHINES**

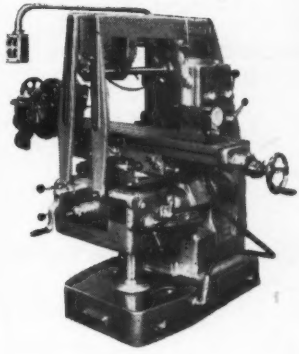
Model 0



Model 1



Model 2



★ Special terms for members of B.A.M.T.M.

**HERBERT WIDDOWSON & SONS LIMITED**

Canal Street Works, Nottingham. Tel : 51891 (4 lines) Grams : TOOLS, NOTTINGHAM

# INDUSTRY WELCOMES THE NEW TECALEMIT RIBBON FILTER ELEMENTS

*Setting a fresh standard of high efficiency filtration for*

**AIR—WATER—PETROL DIESEL AND FUEL OILS | LUBRICATING, HYDRAULIC AND OTHER FLUIDS**

## Chosen for the famous FISHER Small Volume Regulators

Tecalemit Ribbon Filter Element is used in the series 67 combination Filter Regulator, manufactured by Fisher Governor Company Limited of Rochester. In such an application, the paper ribbon filter allows air to flow freely and provide adequate filtration, and water separation. A Tecalemit ribbon filter is sufficiently robust to withstand pressure drops well in excess of normal working conditions.

## Tecalemit Ribbon Filter Elements

**Simple construction—Low cost—High flow rate—Easy to clean**

The elements are formed to resin impregnated cellulose ribbon, wound helically and electrically fused into an open-ended cylinder. Innumerable microscopic orifices between the ribbons allow a very high flow rate, while retaining impurities on the outside or inside surfaces, according to direction of flow.

The standard range of diameters (in any length) covers most applications and no other filtration material can so readily be adapted to individual requirements for filters, strainers, breathers or separators. Never before has such fine filtration been possible at such low cost and with such flexibility in use.

***Tecalemit Ribbon Elements filter to maximum purity***

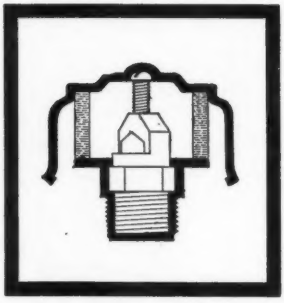
## Tecalemit Air Breather Filters

**(Incorporating Tecalemit Ribbon Filter Elements)**

Cheapest—most efficient—cleanest to service Tecalemit Breathers act as ventilators to provide a free flow of clean air to hydraulic fluid, fuel and oil reservoirs. They give positive protection from airborne contamination to tanks, pumps, valves, cylinder and other engine components.

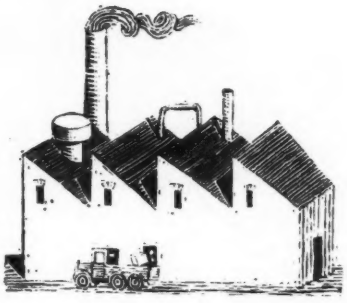
Of the standard types, two are breathers with screwed bodies, and the third is a combined clip-on assembly of breather and filter cap. All are fitted with Tecalemit Ribbon Filter Elements.

***Tecalemit Breathers provide pure air cheaply and efficiently***



**TECALEMIT the authority on filtration**

TECALEMIT LIMITED · (SALES M) · PLYMOUTH · DEVON

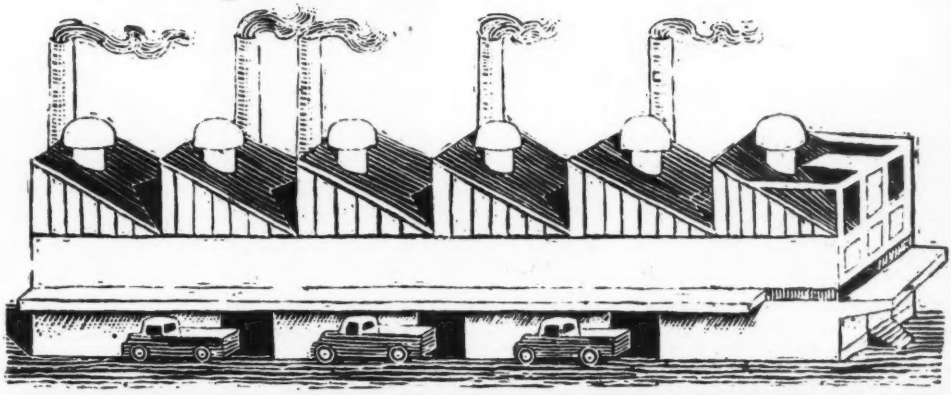


**plus**

There can be no expansion in a competitive business without the regular addition of the latest machinery and equipment. This is where Mercantile Credit facilities can prove such a vital factor in your development. They enable you to acquire the machinery or plant you need out of income and additional profits, while your essential working capital remains undisturbed.

If you would like more details, please write or telephone to your nearest Mercantile Credit branch.

**equals**



**MERCANTILE CREDIT COMPANY LIMITED**

Argyll House, 246-250 Regent Street, London W.1.
Telephone: REGent 7222
*Member of the Finance Houses Association*

There are Mercantile Credit branches throughout the United Kingdom. Please consult your local telephone directory for your nearest branch.

*When answering advertisements kindly mention MACHINERY.*

# HANDS FOR INDUSTRY...

***LET the various powered movements of the machine be represented by A, B, C, etc. Let the sequence of operations in the cycle be represented as A+B+A−C+A+B−D+C−A−D−E+E−. And let . . . and let . . . . . and let's call in the Martonair Technical Service, which seems to make a habit of doing this sort of thing.***

***THAT'S MARTONAIR—The first name in applied pneumatics.***

Martonair

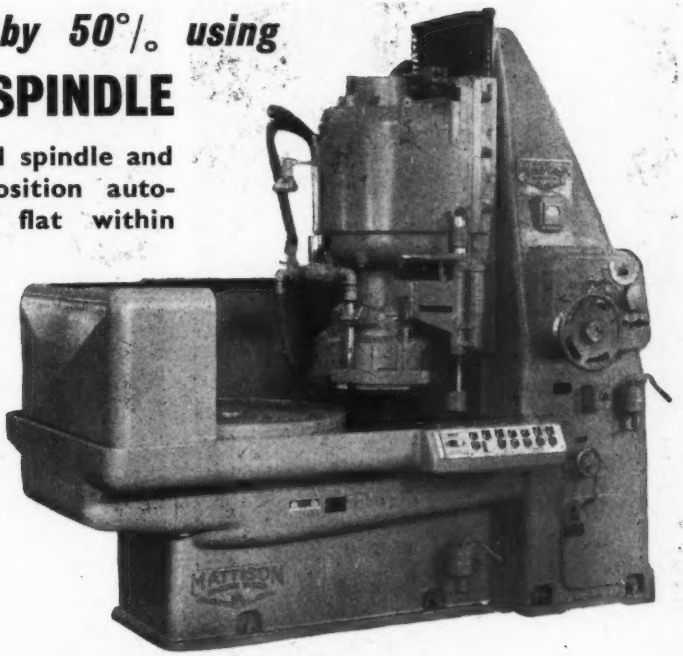
**MARTONAIR LIMITED, Parkshot, Richmond, Surrey.**
Telephone: RIChmond 2201. Telex 24330.
Telegrams: Martonair-Richmond-Surrey-Telex.
Cables: Martonair, London.

*When answering advertisements kindly mention MACHINERY.*

## *Increase output by 50°/₀ using*

# 'QUICK-TILT' SPINDLE

**Rough grind on tilted spindle and return to vertical position automatically to grind flat within 0·0002 in. flatness.**




## *AVAILABLE EX STOCK*

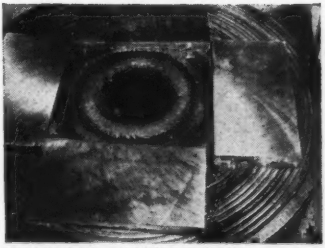
***(subject to prior sale) with :***

36in. magnetic chuck.
48in. dia. swing.
24in. height under wheel.
Worktable speed 8-32 r.p.m.
Traverse worktable 24in. max.
Segmented wheel 20in. x 4in. x 16in.
Wheel head feed 0.005in.-0.165in. p.m. (graduated in 0.0001in.).
Predetermined stop within 0.240in.
Continuous down-feed.
Motors: 40 h.p. spindle.
2 h.p. magnetic chuck.
2 h.p. table traverse.
2 h.p. raising and lowering.
½ H.P. Raising and lowering wheel head.
½ h.p. automatic wheel feed.
½ h.p. coolant pump.
Lubrication : 1-shot Bijur system.

# MATTISON

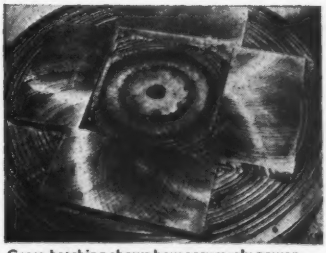
## VERTICAL ROTARY TYPE SURFACE GRINDING MACHINE

**ROUGHING**



Harder wheels and high downfeeds are used in roughing these large, mild steel plates.

**FINISHING**



Cross-hatching shows how accurately power-tilting device returns wheel to the flat position.

## GASTON E. MARBAIX LTD.

**DEVONSHIRE HOUSE, VICARAGE CRESCENT, BATTERSEA, LONDON S.W.11. Phone : Battersea 8888 (8 lines)**

NRP 3403

# DIAMONDS LOOK ALIKE TOO!

**Two cigars may look very much alike. But light up, inhale, and the satisfaction that the Havana Corona gives you is convincing proof of its superiority.** Industrial diamonds, too, may look alike, but there certainly is a difference between the good and the not-so-good which only a diamond expert can see, which *you* can tell only by using them. You have to trust your diamond tool supplier because it is on his integrity and experience that the life of your diamond tools depends.

Indusmond is one of a group of companies who have worked in diamonds for ninety years, and we have been making diamond tools for twenty years. During this period we have established a reputation for quality and integrity that is second to none.

Try Indusmond tools next time—you can trust them!

Please write or 'phone for immediate attention.

*Wheel dressing diamond tools. Wheel forming diamond tools. Shaped and polished diamond tools for turning, boring and hardness testing.*

*Diamond impregnated wheels and laps.*

*Catalogue with technical data available on request.*

**indusmond**

DIAMOND TOOLS

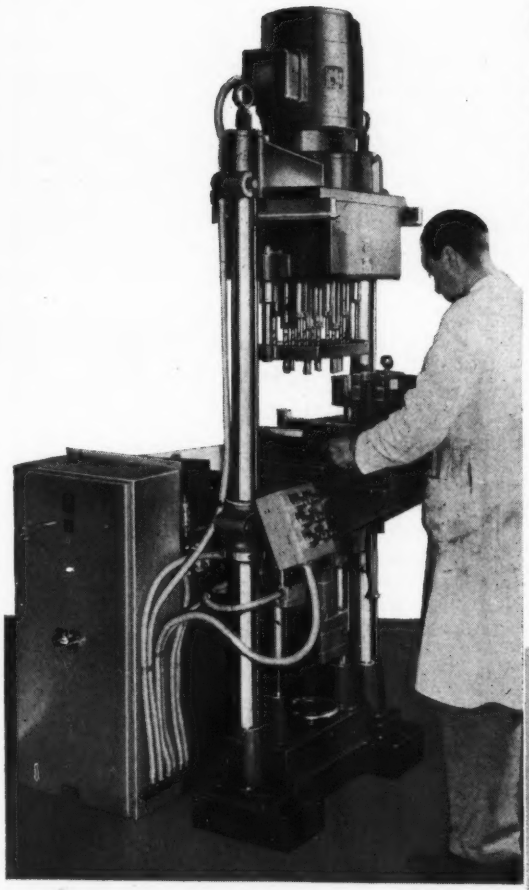
**INDUSMOND (DIAMOND TOOLS) LTD. Memfagimal House, 26-29 St. Cross Street · Hatton Garden · London, E.C.1**

**Tel: CHAncery 7608. Grams: Memfagimal Cent London. Northern Office: Sussex Street, Sheffield 4. Tel: 20701**

*When answering advertisements kindly mention MACHINERY.*

MEDDINGS

# Hydraulic Multi-spindle drilling machines

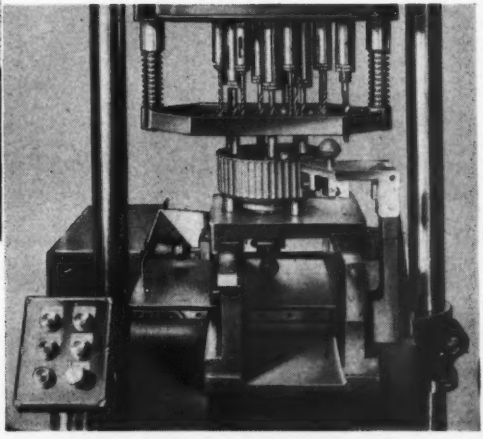


These hydraulic up-stroking multi-spindle drilling machines provide fast approach, accurately controlled drilling feed and fast return of the worktable after completion of drilling. They are extremely flexible in use and can be fitted with driving motors of up to 15 h.p. — the thrust available from standard machines can be varied up to 8,000 lbs.

The machine illustrated is one of two recently supplied to a customer for the quantity production of Brake components. Provision is made for fast changeover of multi-spindle Heads and tooling, and the machines were supplied complete with all necessary jigs and fixtures built to customer's requirements.

'Patterning' of multi-spindles enables one machine to cater for a number of different parts — Heads with up to 90 spindles are in course of production.

A complete range of fixed centre and adjustable type multi-spindle Heads for attachment to existing machines, together with a comprehensive tooling service are also available.



*Write for full particulars to:*

**W. J. MEDDINGS LTD**

IPSWICH ROAD · TRADING ESTATE · SLOUGH · BUCKS

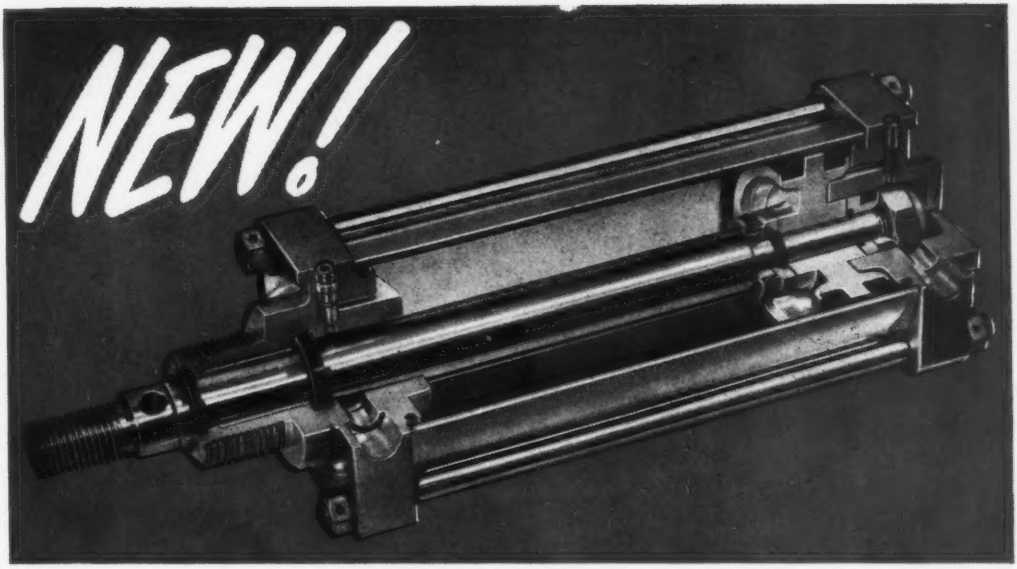
*Telephone: Slough 26761 (5 lines)*

For low production costs
ARCHDALE
MEDIUM DUTY
HIGH SPEED RADIALS
● 17 SPINDLE SPEEDS 15 TO 1,500 R.P.M.
● 6 OR 12 FEEDS
● NORMAL DRILLING CAPACITY 3ins. DIA. IN MILD STEEL
● SIZES RANGE FROM 4ft. TO 8ft. SPINDLE RADIUS
'MACHINERY' Photograph by courtesy of THE GENERAL ELECTRIC CO. LTD., WEMBLEY

**JAMES ARCHDALE & CO. LTD** Blackpole Works, Worcester. Tel: Worcester 27081 (7 lines)

STANLEY SG GROUP

Sole Selling Agents: ALFRED HERBERT LTD., COVENTRY · Telephone COVENTRY 89221

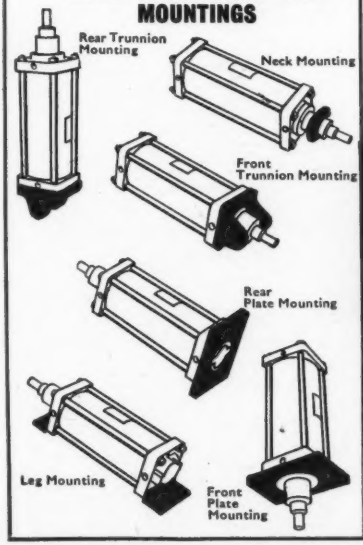



# Schrader SQUARE-END AIR CYLINDERS

## *Cushioned or non-cushioned*

These new Schrader square-end double-acting cylinders will meet a wide range of applications for holding, positioning or moving work or, with push, pull or lifting movements obviate many tiring manual operations. The cylinders have a standard neck-mounting but the square-end design provides for a variety of interchangeable mountings including leg, front or rear plate, front or rear trunnion. Four bore sizes are available with standard piston strokes, cushioned or non-cushioned. The robust construction and new design features give safe, controlled, low-cost power for air pressures of 5 to 150 p.s.i. This range of Schrader Cylinders offers something really new in construction, performance and adaptability. Send the coupon today for full descriptive details and specifications.

**WITH INTERCHANGEABLE MOUNTINGS**




Schrader

**SQUARE-END AIR CYLINDERS**

*Send for full details TODAY*

To: **A. SCHRADER'S SON**, Air Control Products Dept. M
**829 TYBURN ROAD, ERDINGTON, BIRMINGHAM, 24**
*Please send details of Schrader Square-End Air Cylinders*

**NAME** _____

**ADDRESS** _____

_____

252

★ *HIGH SPEED STEEL*

FMP

# TOOL BITS

**FOR IMPROVED PERFORMANCE ON ALL MACHINING OPERATIONS**

**SQUARES** . . . . . $\frac{1}{16}$in. to 1in. BY 2in. to 10in. LONG
**ROUNDS** . . . . . $\frac{1}{16}$in. to $\frac{1}{2}$in. BY 2in. to 6in. LONG
**FLATS** . . 1in. by $\frac{1}{16}$in. to 1$\frac{1}{2}$in. by $\frac{1}{2}$in. BY 4in. to 6in. LONG

**SUPER 18**
FOR ALL NORMAL MACHINING. 18% TUNGSTEN CHROME-VANADIUM.

**455 COBALT**
SPECIALLY DEVELOPED FOR HIGH TENSILE MATERIALS. TUNGSTEN - CHROME - VANADIUM - MOLYBDENUM WITH 5% COBALT.

**808 COBALT**
FOR HIGH SPEEDS AND FEEDS ON DIFFICULT JOBS 10% TO 12% COBALT.

**TRIPLE 5C**
FOR NIMONIC AND HIGH TENSILE STEELS

LARGE STOCKS CARRIED INCLUDING METRIC SIZES ● TERMS TO STOCKISTS DEALERS AND IMPORTERS ● ALSO FORM TOOL TO CUSTOMERS' SPECIFICATIONS.

**PARTING-OFF BLADES ... SUPER 18 GRADE**
SHOT BLAST OR GROUND FINISH IN SIX SIZES FROM 6in. by $\frac{1}{16}$in. by $\frac{1}{16}$in. TO 1$\frac{1}{2}$in. by $\frac{1}{2}$in. by $\frac{1}{16}$in.

*HEAD OFFICE*

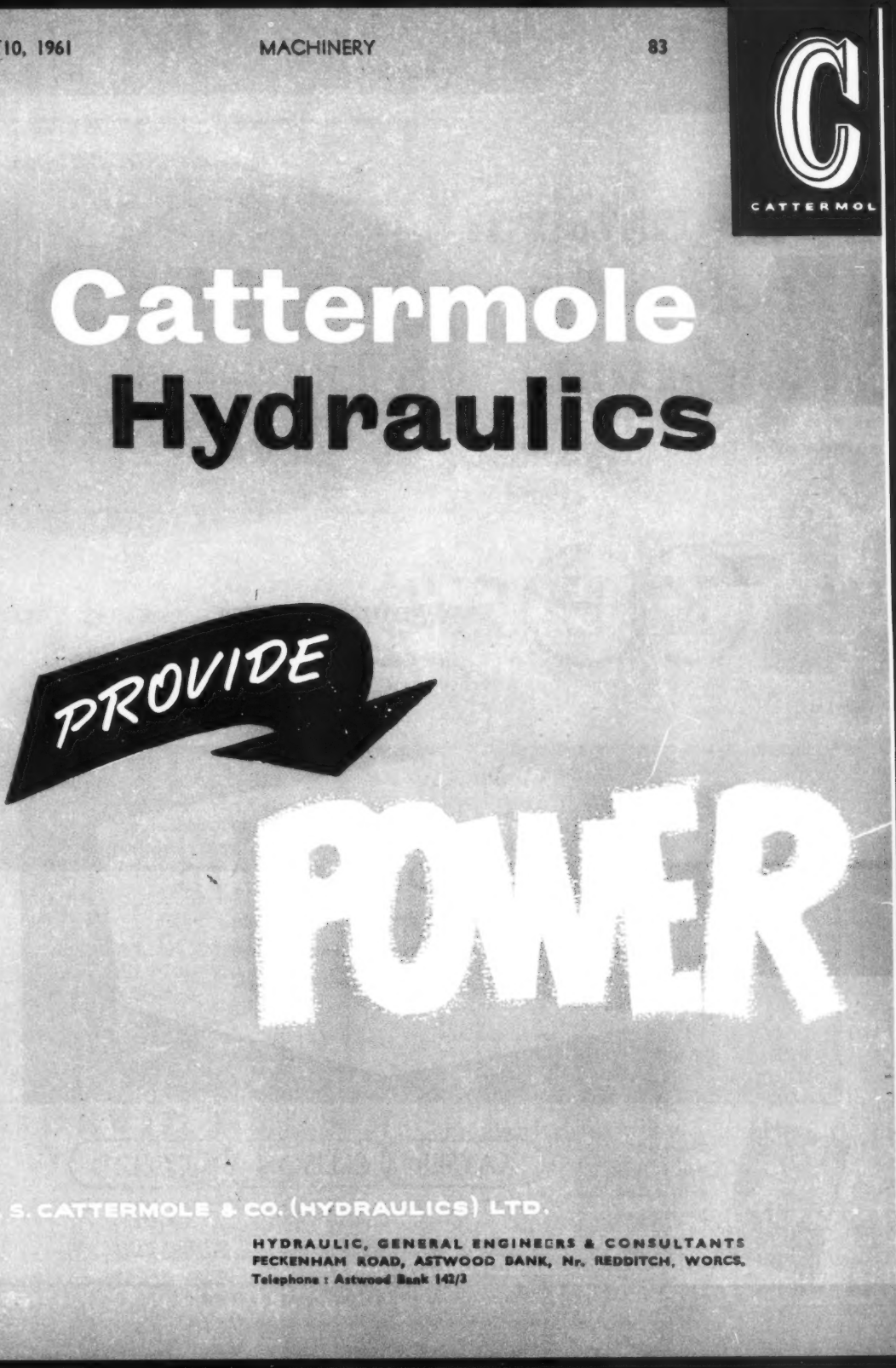
## F. M. PARKIN (SHEFFIELD) LTD.

ST. THOMAS STEELWORKS,
**SHEFFIELD, 8, ENGLAND** *Telephone: 50083 (5 lines)* *Telegrams: 'Sorbitic' Sheffield, 8*

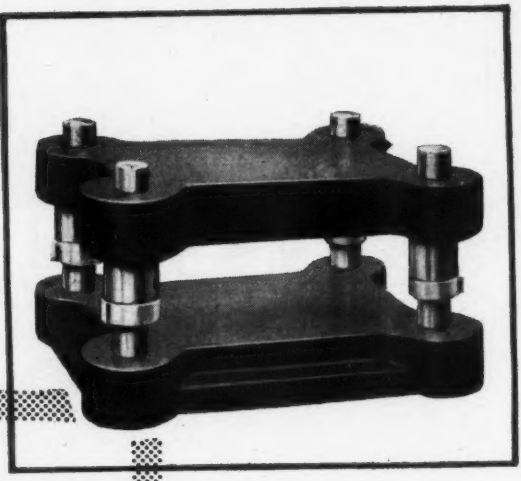
***BRANCH OFFICES and WAREHOUSES***

Chapel Street, Booth Street, Handsworth, Birmingham, 21 *Tel: Northern 9707*
and 6/9, Red Lion Market, Whitecross Street, Finsbury, London, E.C.1 *Tel: Monarch 9102*

**SCOTLAND AND NORTHERN IRELAND:** W. C. WILLIS & CO. Ltd., 172/4, West Regent Street, Glasgow, C.2.
**MANCHESTER AND NORTH OF ENGLAND:** S. H. JACKSON & SMITH LIMITED, 21b, Station Road, Cheadle Hulme Stockport.


C
CATTERMOL
Cattermole
Hydraulics
PROVIDE
POWER
H. S. CATTERMOLE & CO. (HYDRAULICS) LTD.
HYDRAULIC, GENERAL ENGINEERS & CONSULTANTS
FECKENHAM ROAD, ASTWOOD BANK, Nr. REDDITCH, WORCS.
Telephone : Astwood Bank 142/3

# The natural choice for long runs



**KE 970**

2% CARBON 14% CHROME HIGH DUTY TOOL STEEL

*Illustration by courtesy of MESSRS DEXION LIMITED*

## *was chosen by DEXION LTD*

**for the dies and punches to produce their famous slotted angle. Millions of slots have been punched with the minimum amount of tool regrinds.**

*This booklet gives full details and is available free on request.*

KAYSER ELLISON & CO. LTD.

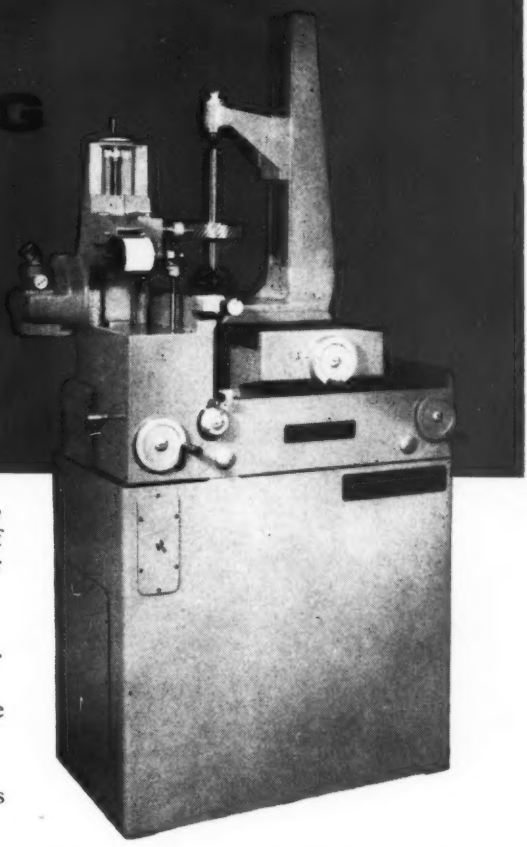
CARLISLE STEEL WORKS · SHEFFIELD 4
Telephone : SHEFFIELD 22124 ESTABLISHED 1825

**LONDON STOCK WAREHOUSE**
4 Pembridge Mews, Notting Hill Gate, W.11.
Telephone : BAYswater 9131/2

**MIDLAND STOCK WAREHOUSE**
Station Road, Coleshill, Birmingham.
Telephone : Coleshill 2041/2

# THE DAVID BROWN SERIES 18 MEASURING MACHINES

provide a simplified yet highly accurate means of measuring gear tooth profiles and helices



In design, operation, construction *and price* this equipment meets the requirements of the standards room, final inspection, or production shop.

COMBINED TESTING
measurement of profile and helix *at one set up.*

OPERATING PRINCIPLE
use of the individual base disc principle ensures positive setting.

CAPACITY
accommodation for spur and helical gears between $\frac{7}{8}$″ and 18″ base diameters.

SETTING AIDS
helix angle setting by direct reading illuminated microscope.

RECORDINGS
graphical recording by mechanical or electronic means.

**If you cut gears — more particularly if you finish-grind or shave them — this equipment must be of interest. Ask for literature or, better still, ask for a David Brown Sales Engineer to call.**
**Ask also about the comprehensive range of gear roll checking equipment for gears up to 24″ centres.**

**DAVID BROWN**

100 YEARS SERVING ENGINEERING INDUSTRY 1860-1960

Series 18 Involute & Helix measuring machines

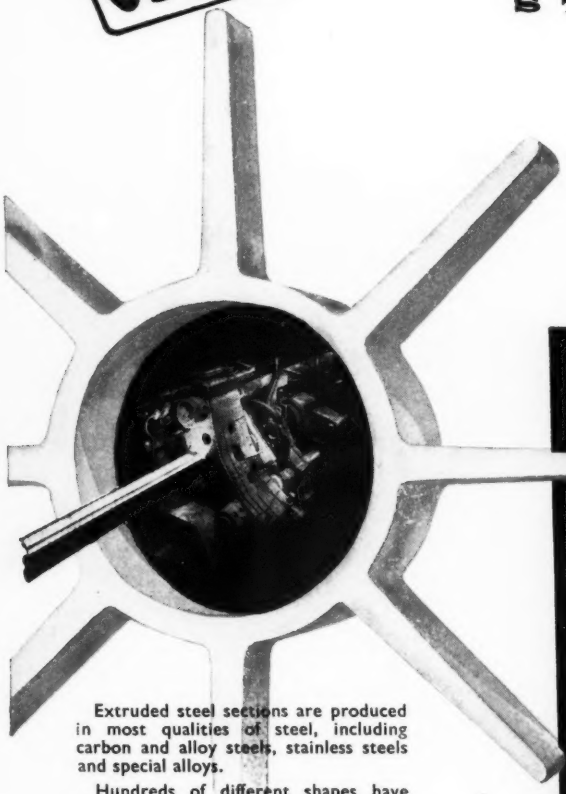
*An alliance of engineering specialists in gearing, machine tools, tools, castings, automobiles, and agricultural tractors and machinery.*

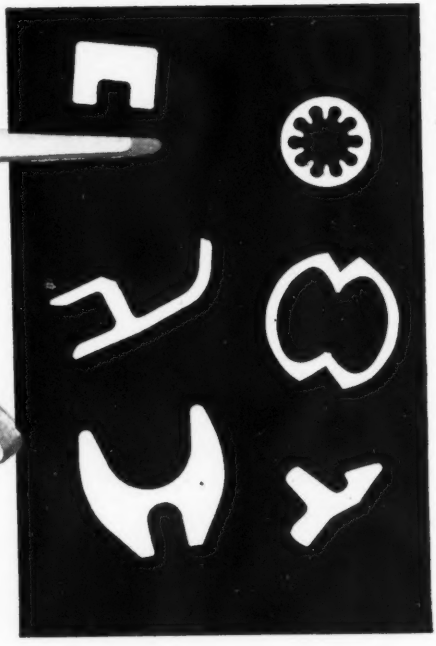
THE DAVID BROWN CORPORATION (SALES) LIMITED
TOOL DIVISION · PARK WORKS · HUDDERSFIELD · TELEPHONE: 3500

OSBORN

EXTRUDED
STEEL
SECTIONS

*Cut Costs*





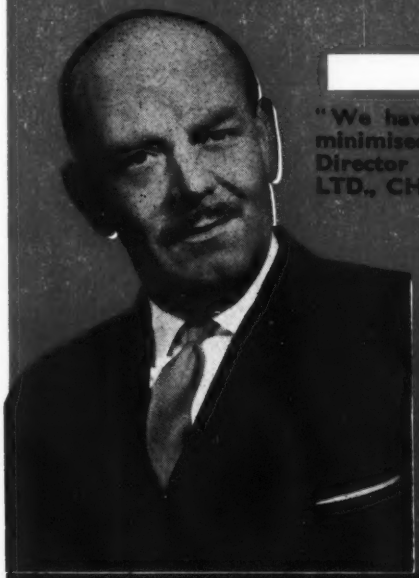
Extruded steel sections are produced in most qualities of steel, including carbon and alloy steels, stainless steels and special alloys.

Hundreds of different shapes have already been extruded, ranging from simple angles to most complex shapes. Physical properties are identical with similar rolled sections and extrusions can be supplied in random lengths of 8 to 30 feet, with dimensional tolerances to suit requirements.

***Send for further details of Osborn extruded steel sections***—and take the first step to lower costs by reduction of machining and elimination of scrap.

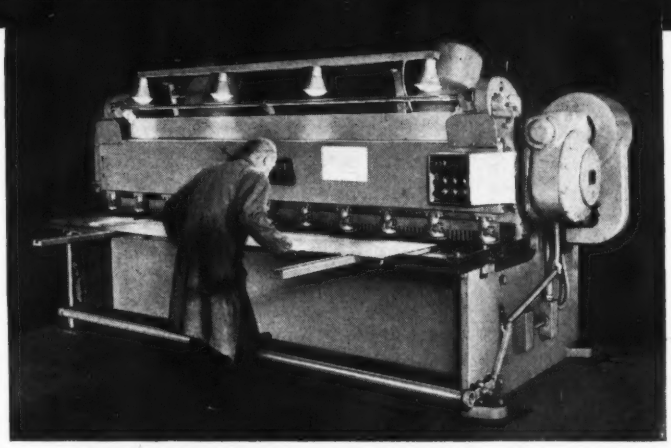
SAMUEL OSBORN & CO., LIMITED
CLYDE STEEL WORKS, SHEFFIELD
*Steelmakers · Steelfounders · Engineers' Toolmakers*

# Leading Steel and Aluminium stockholders standardise on CINCINNATI



**"We have improved service, increased accuracy and minimised delivery time", says Mr. J. A. Coles, Director and General Manager of GRADES METALS LTD., CHERTSEY, SURREY.**

" Because of the varied sizes and thicknesses of sheet we supply, much of our production time used to be taken up with back-gauge and knife-clearance setting. As soon as we installed our first Cincinnati Shear, we found that re-setting time could be almost eliminated. The one knife clearance for all thicknesses of metal further speeded up production and output waste through human error. By standardising on Cincinnati, we can dispense with unnecessary operations, achieve greater flexibility and increase output."



**The CINCINNATI SHAPER CO. LTD.**

*A wholly-owned subsidiary of The Cincinnati Shaper Co., Cincinnati, Ohio, U.S.A.*

**PEEL PARK PLACE, EAST KILBRIDE, GLASGOW.**
**Telephone: East Kilbride 20641.**

Distributors in England and Wales:
**E. H. JONES (MACHINE TOOLS) LTD.**
Hove, London, Birmingham, Manchester and Bristol.

CINCINNATI

## GUILLOTINE SHEARS

**On a Cincinnati Shear, the back-gauge is power-set by the operator from the working position, instantly and with micrometer accuracy. All thicknesses of metal up to the capacity of the machine are cut with the same knife clearance. High strength rigidity of the Shear members reduces deflection and permits accurate, close setting of the knives.**

1961

Ma

# hopping for Solenoids

*"Cynthia, darling, be reasonable; nobody told me Westool had such a whopping big range of solenoids, they simply said get Westool . . . they're so compact, utterly, utterly reliable. Seems they're tested and re-tested at every stage of manufacture. What a frightful bore! Still, I expect it's one reason why Westool solenoids are so jolly good. Steady, old girl! We shan't be long now, we've got the D.C. Pull and Thrust models, we've only to collect their A.C. Types. Cynthia—really!"*

**Westool solenoids, entirely self contained, can be fitted into any control system—remote, automatic or push button. Action instantaneous and certain.** *Write for full technical details.*

# WESTOOL

the best buy of all

**WESTOOL LTD., St. Helen's Auckland, Co. Durham.**
Telephone: West Auckland 551 (6 lines). Telegrams: Solenoids West Auckland.

**LONDON**: 2, Ashley Place, Carlisle Place, S.W.1. Telephone: Victoria 7301-2.

**BIRMINGHAM**: Silhill House, 2241 Coventry Road, Sheldon, Birmingham, 26
Telephone: Sheldon 5121-2.

WESTOOL LIMITED

**From Zero to 12 tons at the touch of the foot. Think of the work you could do with a Press that delivers 12 tons Pressure on a 12″ x 12″ worktable. There's ample room too for the project you have in mind if it can be encompassed within the 12″ Daylight and 12″ Throat available. Speedy too, with it's 6″ stroke, 4 seconds down and 3 seconds return with both hands free to handle the work. Compact in size and weighs only 10¼ cwts.**

## *PILOT WORKS LTD.*

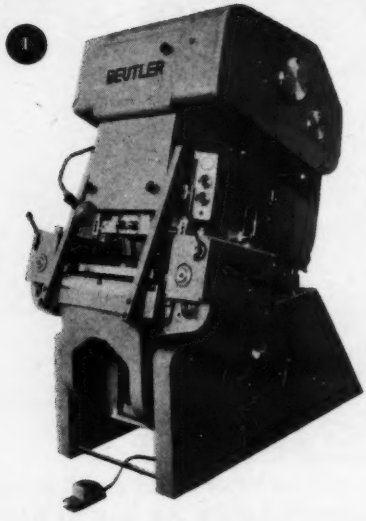
*Manchester Road, Bolton. Tel: Bolton 23231. London Office: 3 Southampton Place, W.C.1. Tel: CHAncery 5130*

'Eclipse' hacksaw blades and other tools are made by James Neill & Co. (Sheffield) Ltd. and are obtainable from all tool distributors.

UHSI

*When answering advertisements kindly mention MACHINERY.*

# KIMBELL INTRODUCE 4 NEW MACHINES TO BOOST OUTPUT SLASH COSTS!




**BEUTLER** PRESSES
Particularly Suitable
for 'Fine-Blanking'

THE **FIRST** MECHANICAL FINE-BLANKING PRESSES WITH 200 STROKES PER MINUTE!

- These presses eliminate subsequent shaving operations.
- Produce only absolutely flat components.
- Presses are extremely rigid—possess no deflection.
- Stroke rates are infinitely variable from 66 to 200 strokes per minute.
- Full range of mechanical presses from 5 tons to 200 tons.

Sample components will astound you —ask to see them!

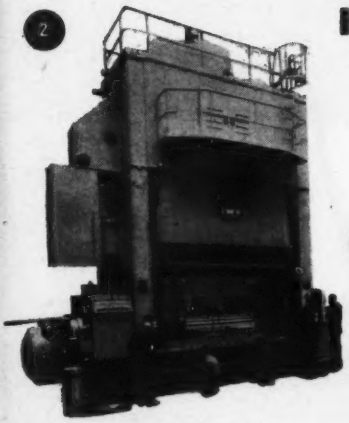
# KIMBELL MACHINE

**KIMBELL MACHINE TOOLS LTD., 4, SOUTH LAMBETH**

# IWK TRANSFER PRESSES

These fully proven machines eliminate inter-stage annealing operations and combine, in one machine, a number of operations normally carried out on several single or double action presses. The exclusive I.W.K. quick tool-changing device reduces change-over times to a minimum of two hours. Please submit samples or drawings for detailed production propositions or request our press specialist to call. Available from 16-1000 tons capacity with 6-14 tool stations.

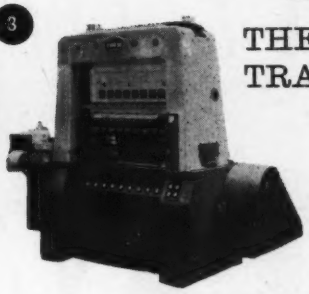
2



## THE NEW 550 TON TRANSFER PRESS

–finishes very large components with every stroke of the press.

3



## THE NEW 40 TON TRANSFER PRESS

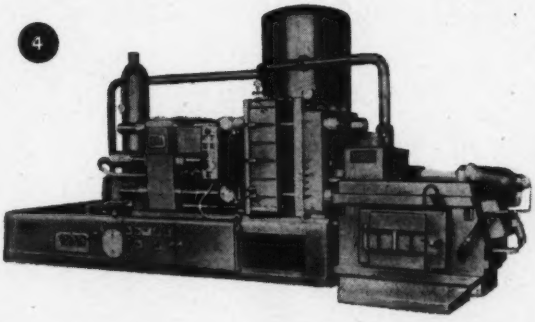
Has the following advantages:

- Upright and crown are cast in one piece.
- Instant speed adjustment and infinitely variable stroke rates up to 80 strokes per minute.
- Underslung drive reduces lateral forces on the ram guides.
- Vibrations are eliminated – resulting in longer tool life.
- Presses are equipped with automatic safety devices which check correct transfer from one station to another etc. Press stops instantly in any emergency.

# IDRA DIE-CASTING MACHINES

## THE NEW COLD-CHAMBER PRESSURE DIE-CASTING MACHINES WITH AUTOMATIC FEEDING AND 'VACUCAST' EQUIPMENT

4



- No ladling.
- Fully automatic production runs.
- Three-phase injection.
- Hydraulic ejection

IDRA Die-Casting Machines are quickly and simply set up. The robust construction withstands any injection shock loads. Two to three injection positions with hydraulic height adjustments are available. Hot and cold chamber machines with 100 to 1,000 tons locking force. Radial core pullers can be fitted to the fixed and movable platen, and their movements can be sequence controlled. The core pullers are programme controlled by punched metal cards so that the desired sequence can easily be selected

POST THIS COUPON TO KIMBELL MACHINE TOOLS LTD. 4, SOUTH LAMBETH PLACE, LONDON, S.W.8
AND TICK THE SQUARE WHERE YOU WOULD LIKE COMPREHENSIVE LITERATURE:

# TOOLS LTD

PLACE, LONDON S.W.8. REL 6711

☐ IWK Transfer Presses. ☐ IDRA Die-Casters.
☐ Beutler Presses.

Name .....

Address .....

..... MI

*When answering advertisements kindly mention MACHINERY.*

# Spectra -Spray

## TOOL ROOM BLUE

*Spectra Color Blue - In the Speedy Aerosol Pack*

SPECTRA AIDS TO INDUSTRY

Spectra-Spray is a Tool Room MUST—the up-to-date answer to all marking problems. It cannot spill, leak or evaporate; dries in seconds in a film which will not smudge, chip, crack or peel, is impervious to water, oil or petrol and is permanent until machined off or removed with Spectra-Remover.
Spectra-Spray is by the makers of Spectra-Color Layout and Identification fluid. Full details of these and all other products gladly sent on request.

**SPECTRA CHEMICALS LIMITED**

Spectra Works, High Street, Caterham, Surrey. Telephone: Caterham 3182 & 2293

# of our technical advice service?

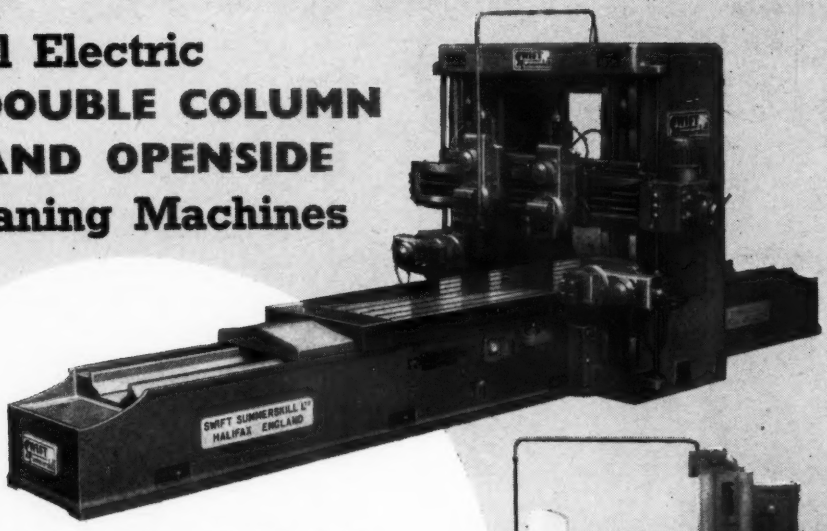
Our files are already bulging with case-histories of remarkable improvements in performance, production and economy as a result of visits by our Technical Representatives. Many of Britain's large engineering industries are constantly making use of this Service, which includes advice on Drilling, Reaming and Milling—in fact most methods of metal removal. And it's free!

***Make sure you are using the best tool for the job, and the best method of application. Save time and money — use our experience.***

**DORMER** THE SHEFFIELD TWIST DRILL AND STEEL COMPANY LIMITED
SHEFFIELD ENGLAND

DORMER TOOLS ARE OBTAINABLE FROM YOUR USUAL ENGINEERS' MERCHANTS

# All Electric DOUBLE COLUMN AND OPENSIDE Planing Machines




The Swift-Summerskill range of Planing Machines includes Double Column and Openside types which can be built with any length of table. All machines are electrically driven with spiral drive to the table and have electrically-operated feed. Standard machines have capacities up to 12ft. by 5ft. by 4ft. An auxiliary column can be supplied for the larger openside machines as illustrated.

*Available for Early Delivery*

All these machines are fitted with two cross slide toolboxes and one side toolbox.

Double Column Type 36 SM. Capacity 8ft. 0in. by 3ft. 0in. by 2ft. 6in.

Double Column Type 48 SM Capacity 12ft. 0in. by 4ft. 0in. by 3ft. 6in.

Openside Type 48 MOS. Capacity 10ft. 0in. by 4ft. 0in. by 3ft. 6in.

Openside Type 360 SM. Capacity 8ft. 0in. by 3ft. 0in. by 2ft. 6in.

Above. Swift Summerskill Double Column Planer Type 48 SM. Capacity 10ft. 0in. by 4ft. 0in. by 3ft. 6in.

Left. Swift Summerskill Open side Planer Type 48 OSM. Capacity 10ft. 0in. by 4ft. 0in. by 3ft. 6in.

*Write today for full details*

**SWIFT-SUMMERSKILL LIMITED**

*Member of the Asquith Machine Tool Corporation*

CLAREMONT WORKS . HALIFAX . ENGLAND

Telephone : Halifax 3792 & 3793.

SWIFT Summerskill

1961

MA
new
pub
Pub
trad
All
rese
Uni
righ
thro
© Lim
REGI
ADVE
PHO
To
Brig
N
93,
Ed
PR
pe
SU
52
fre
m
Co
AD
ad
re
of
Sm
ac
of
on
se
Bl
no
pu

MACHINERY is registered as a newspaper at the General Post Office and is published every Wednesday by The Machinery Publishing Co., Ltd. The name is a registered trade mark.

All rights of reproduction and translation are reserved by the publishers by virtue of the Universal Copyright and International Copyright (Brussels and Berne) Conventions and throughout the World.

© The Machinery Publishing Company, Limited, 1961.

**LONDON OFFICE**

REGISTERED OFFICE, EDITORIAL, SMALL AND CLASSIFIED ADVERTISEMENTS DEPARTMENTS AND ENQUIRY BUREAU

CLIFTON HOUSE
83-117 EUSTON ROAD
LONDON, N.W.1

Telephone: Euston 8441/2
Telegrams: Machtool, Norwest, London

**HEAD OFFICE**

SUBSCRIPTION, ADVERTISEMENT, SERVICE, PHOTOGRAPHIC, ACCOUNTS AND BOOK DEPARTMENTS

NATIONAL HOUSE
21 WEST STREET,
BRIGHTON, 1

Telephone: Brighton 27356 (4 lines)

Telegrams: Machtool, Brighton

NEW YORK: 93, Worth Street

PARIS: 15, Rue Bleue

*Managing Director:* LESLIE R. MASON
*Editor:* CHARLES H. BURDER
*Chief Associate Editor:* P. A. SIDDERS
*Associate Editors:* A. P. LIPSCOMBE, G. W. MASON, S. C. POULSEN, R. E. GREEN, A. W. ASTROP, A. J. BARKER
*Editorial Representatives:* F. W. HERRIDGE, R. SUTCLIFFE

PRICE PER COPY:—One shilling and threepence.

SUBSCRIPTIONS:—Inland and overseas, 52 shillings per annum (and pro rata), post free. Cheques and Money Orders should be made payable to the Machinery Publishing Co., Ltd.

ADVERTISEMENTS:—Copy for displayed advertisements, if proofs are required, should reach the Brighton office 21 days in advance of publication. Rates on request. Small (classified) advertisements can be accepted, space permitting, at the London office up to Wednesday, for publication on the following Wednesday. For rates, see p. 149.

Blocks are held at advertisers' own risk; no responsibility for loss is accepted by the publishers.

# MACHINERY

*A JOURNAL OF METAL-WORKING PRACTICE & MACHINE TOOLS*

Vol. 98, No. 2530 May 10, 1961

MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

COPIES PRINTED ..... 11,500 per week
CERTIFIED DISTRIBUTION ..... 11,293 per week
CERTIFIED PAID DISTRIBUTION ..... 9,827 per week
*Copies sold at full price* ..... 9,594 per week
*Copies sold at reduced prices* ..... 233 per week

## CONTENTS

**Editorial** PAGE

Developments in Mechanical Applications of Magnetic Force 1043

**Principal Articles** (*For abstracts see next page*)

Batch Production with Numerically-controlled Machines .. 1044
Combined Eccentric Boring and Turning Operations .. .. 1052
Making Spare Parts for Oil Well Equipment .. .. .. 1057
Japanese Machine Tool Factories—8 .. .. .. .. 1067
East German Machine Tools at the Leipzig Fair .. .. 1074

**Short Articles**

Photo-electric Tracer Head for Flame Cutting Machines .. 1056
Solex Gauging Equipment for Cylinder Bores .. .. .. 1056
Special Machine for a Motor Car Steering Gear Component 1066
Construction Work on a Large Walking Dragline .. .. 1073
Machine Shop Patents .. .. .. .. .. .. 1089
Use of Interrupted Feed for Chip-breaking .. .. .. 1090
Black & Decker Portable Electric Drill .. .. .. 1093

**New Production Equipment**

Kearns Model 451 P Planer-table Type Horizontal Surfacing and Boring Machine with A.E.I. Control Equipment .. 1082
Vero Hydro-Copier Hydraulic Copying Attachment .. .. 1083
Thompson Type CX Plunge-Matic Surface Grinding Machine 1084
Hepworth 250 D.S. Hydraulic Die-sinking Attachment .. 1085
SHW Type UF2 Omniplex Toolroom Milling Machine .. 1086
Autocaster Semi-automatic Gravity Die Casting Machines .. 1087
Mattison Loading Unit for a Duplex Disc-type Grinding Machine .. .. .. .. .. .. .. 1088

**News of the Industry**

Cheshire .. .. .. .. .. .. .. .. 1091
Scrap Metals Report .. .. .. .. .. .. 1095
Industrial Notes .. .. .. .. .. .. .. 1096
Machine Tool Share Market .. .. .. .. .. 1097
British Machine Tool Imports and Exports (Classified) .. 1098
Prices of Materials .. .. .. .. .. .. 1100

Classified Advertisements .. .. .. .. .. 149
Index to Advertisers .. .. .. .. .. .. 181

# Abstracts of Principal Articles

## Batch Production with Numerically-controlled Machines .. .. .. P. 1044

Two Cincinnati EMI-tape-controlled vertical milling machines are installed at the Queens Island, Belfast, works of Short Brothers & Harland, Ltd., and are maintained in continuous production of small and medium-size batches of aircraft components. In this article, an evaluation of the advantages which have been gained over a 12-month operating period are discussed, and comparisons are drawn between the pre-production times and tool and component-manufacturing costs for conventional copy-milling and tape-controlled milling. For programming and punching the tapes, extensive use is made of an English Electric DEUCE computer, which was already installed in connection with the work of the company's stress and aerodynamic departments. An average weekly computer time of one hour is usually sufficient to keep the two milling machines supplied with tapes. To facilitate programming, the company has developed a code system, which covers the ten most commonly-used geometrical shapes, and full details are given of this code. Its application is explained with the aid of a simple workpiece. (MACHINERY, 98—10/5/61.)

## Combined Eccentric Boring and Turning Operations .. .. .. .. P. 1052

This article describes equipment which has been developed to enable off-set holes to be bored simultaneously with the turning of the periphery of a workpiece. Examples of the type of components that have been machined in this manner include crankshafts, compressor casings, clutch discs, and sprockets. A more advanced arrangement provides for machining an elliptical periphery simultaneously with the boring of twin off-centre holes. (MACHINERY, 98—10/5/61.)

## Making Spare Parts for Oil Well Equipment P. 1057

Mission Manufacturing Co., Ltd., are one of the many firms which have recently occupied premises in Northern Ireland under the industrial development programme instituted by the Ulster Government. Engaged in making spare parts for oil-well equipment in small and medium-size batches, the company's products included cylinder liners, piston rods, piston heads, and valves for slush-pumps. Details are given of various interesting set-ups, including rough-turning liners on a 75-h.p. Maximajor lathe; induction-hardening on a fully-automatic EMA machine; honing on British-built Fulmer equipment; and form-milling on Cincinnati machines. Details are also given of several special measuring and inspection machines which have been built to the company's specification. (MACHINERY, 98—10/5/61.)

## Japanese Machine Tool Factories P. 1067

The eighth in a series on Japanese machine too factories and their products, this article is concerned with the activities of Nippei Industrial Co., Ltd., who build, mainly, grinding machines of the cylindrical and centreless types. The company was started not long before the war, to make machine guns and ammunition, but soon turned to the building of machine tools with the aid of a technical assistance agreement with the Swiss Oerlikon organization. Some details of the factory occupied on the outskirts of Yokohama, and of the plant installed, are given, and some typical machine tools now being built by the company are discussed. These machines include plain and universal cylindrical grinders and centreless grinders, also a vertical cylindrical grinding machine. Some machines supplied to the motor car industry are also described. (MACHINERY, 98—10/5/61.)

## East German Machine Tools at the Leipzig Fair .. .. .. .. .. P. 1074

This third article on machine tools shown at the Leipzig Spring Fair makes reference to automatic cycle control on universal and plain cylindrical grinding machines, also to automatic loading equipment for a cylindrical grinder. Air-operated, the latter equipment is designed for application to a wide range of different types of standard machine tools. Developments in connection with honing machines include the production of a range of standardized units such as heads, columns, bases, and in-line and rotary indexing tables. A special slicing machine for semi-conductor materials is equipped with a diamond-impregnated disc cutter with a central hole. Programme control of the movements of a vertical milling machine table in three directions was demonstrated on a workpiece on which surfaces were milled at five different levels, and an automatic thread-rolling machine with a magnetic disc-type hopper feed was also shown. (MACHINERY, 98—10/5/61.)

### Contributions to MACHINERY

If you know of a more efficient way of designing a tool, gauge, fixture, or mechanism, machining or forming a metal component, heat treating, plating or enamelling, handling parts or material, building up an assembly, utilizing supplies, or laying out or organizing a department or a factory, send it to the Editor. Short comments upon published articles and letters on subjects concerning the metal-working industries are particularly welcome. Payment will be made for exclusive contributions.

EDITORIAL

# Developments in Mechanical Applications of Magnetic Force

Apart from the essential roles of magnetic fields in connection with innumerable types of electrical and electronic equipment, the forces which these fields exert on certain kinds of materials have long been turned to account for a variety of purposes. Some of these well-established applications involve movement under the influence of magnetic force, but in very many instances a holding action is all that is required. During comparatively recent years, there has been a rapid extension in the utilization of magnetic equipment of various forms, partly on account of the important developments that have taken place in connection with magnet materials, their treatment, and the design of the units in which they are incorporated, and partly because fresh problems have arisen that could conveniently be solved in this manner. It may be pointed out, for instance, that the demand for automatic feed and speed changing on machine tools has resulted in the much wider adoption of electromagnetic clutches for which remote control can be readily arranged.

Movement—due to a force of attraction or repulsion—and/or holding action can be obtained with either a permanent or an electro-magnet. With the latter, control is inherent, since the magnetic effects depend upon the energizing current. Formerly, however, the utility of permanent magnets for applications within the mechanical field was seriously restricted owing to inability to "switch off" the force exerted. This drawback was overcome by the introduction of permanent magnet units whereby the gripping force can be applied and released at will by a mechanical action. For various purposes such a unit offers the advantages that it is compact and self-contained, and when it is employed for work holding, for instance, there is no risk of the grip being released due to a failure of the power supply. Later, another type of unit was developed, which is energized and de-energized electrically. The current is, however, applied only momentarily, and the gripping force is subsequently sustained entirely by residual magnetism.

In a lecture on Magnetic Tools delivered recently in Sheffield to the Permanent Magnet Association, Dr. Alan Edwards drew attention to the capabilities of certain types of modern magnetic equipment, with particular reference to work holding equipment for use on machine tools. As machine performance continues to be improved, with consequent reductions in the duration of working cycles, ease of loading and unloading, and secure clamping, assume increasing importance, and for a considerable range of work, magnetic chucks may offer significant advantages. There is still sometimes a tendency to associate such chucks largely with thin, delicate, workpieces and light surface grinding operations. With modern chucks, however, provided that certain precautions are observed, work can be held for milling, planing, and shaping with heavy stock removal. Necessarily, the grip of a chuck is affected to a considerable extent by the condition of its surface and that of the work, and for severe operations it is essential to provide stops to prevent sliding.

Magnetic chucking is by no means confined to flat workpieces since a variety of fixtures, some of which have a vice action, can be employed in conjunction with the standard chucks, to suit components of a diversity of forms. Magnetic lathe chucks are also available, which facilitate turning operations on various parts that might otherwise be difficult to hold without distortion, and here again, the use of special plates may offer advantages in certain circumstances.

Work handling is another field in which magnetic devices are playing a part of increasing importance. At one end of the scale, hand magnets, which may be energized and de-energized by push-button, may be used for grinding and polishing operations on pieces that would otherwise be difficult to grip. Another simple but effective device is the magnetic "floater" which ensures separation of sheets or blanks so that they may readily be picked up singly for feeding to a press or for some other purpose. Magnets may also be used in conjunction with "mechanical hand" equipment for loading blanks into press tools.

In connection with the automatic feeding of small parts from hoppers or magazines and their transfer between linked machines, magnets can sometimes be used to good effect. For example, magnetized material is now available in strip form which can readily be cut into lengths and applied to conveyors for carrying ferrous parts up steep slopes. Magnetic belt-type elevators are also available as com-

(*Continued on page* 1093)

# Batch Production with Numerically-controlled Machines

## Some Aspects of the Practice of Short Brothers & Harland, Ltd., Queens Island, Belfast, for the Production of Aircraft Components in Small Quantities

By A. W. ASTROP, Associate Editor

THE HISTORY OF Short Brothers & Harland, Ltd., dates back to 1898, when Oswald and Eustace Short established a works at Battersea for the manufacture of aerial balloons, and early customers included the Indian Government and the Royal Aero Club. It may be mentioned that the first Short heavier-than-air machine was produced 11 years later, by which time Horace Short had joined the company, and the brothers were soon to receive what is believed to have been the first production order for airplanes, namely, a contract to build six biplanes for Orville and Wilbur Wright.

Since that time, the name Short has been prominent in connection with the development of aircraft, and of the aircraft industry, and is associated with world-famous designs such as the Cromarty, Calcutta, Sarafand, Empire, and Sunderland flying boats, also the Stirling bomber. In 1936, the Short brothers amalgamated with the well-known ship-building firm of Harland & Wolff, Ltd., to form Short & Harland's aircraft factory at Belfast, and in 1948, on the transfer of Short Brother's headquarters from Rochester to Belfast, the present company of Short Brothers & Harland, Ltd., was formed.

In recent years, the company has been active in producing military versions of the Britannia turbo-prop airliner, and the type P.R.9 Canberra, also in the development of the Belfast S.C.5 long-range freighter for use by the R.A.F. In addition, work is proceeding on the type S.C.7 light freighter, which is a private venture. In 1960, moreover, the company was responsible for an important advance in the development of aircraft when the S.C.1 VTOL machine successfully achieved transition from hovering to forward flight, and vice versa.

**Fig. 1. General view of the English Electric DEUCE computer, and associated Hollerith punched-card equipment, which is installed at the Queens Island works of Short Brothers & Harland, Ltd.**

The main machine shop at the Queens Island works has an area of approximately 50,000 sq. ft., and the company has other factories on a newly-developed estate on the outskirts of Belfast, where activities include the development of the Seacat guided missile, production of analogue computers, and the development of hydraulic systems for industrial applications. From the standpoint of equipment and machine tools, the company's outlook has always been progressive, and has resulted in early accep-

**Fig. 2. The interior of this gear-case, and the off-set bore seen at the right-hand side, are machined from the solid under punched-tape control**

tance and application of newly-developed techniques. Because of this attitude, it may be noted, the possibilities of numerical control were quickly appreciated. Two E.M.I.-controlled, 2-dimensional, Cincinnati vertical milling machines are installed at the Queens Island works, and are maintained in continuous production of small and medium-size batches of aircraft components. The first machine, which was acquired in May, 1957, has a work-table measuring 30 by 10½ in., whereas the second machine, which was delivered in September, 1960, is slightly larger and has a work-table measuring 30 by 13½ in. Punched-tapes for both machines are prepared with the aid of an English Electric DEUCE computer, which operates in connection with Hollerith punched-card equipment, and it is interesting to note that the average weekly computer time required to keep both milling machines in continuous production is only 1 hour.

For the remainder of the time, the computer is employed on analytical work for the company's stress and aerodynamic departments, and computer time is also rented by other organizations, universities and colleges. A general view of the DEUCE computer and its associated equipment is given in Fig. 1, where the main unit is seen in the centre background. The group of equipment at the left comprises, from left to right, a Hollerith punched-card reader, the main control desk for the computer, and the tape-punching unit. Hollerith cards are punched with the aid of a small desk-mounted unit (not shown in the figure) from information provided by the programming department, and the work of this section will be explained later with the aid of a simple example.

After the Hollerith cards have been punched, the complete stack for the workpiece concerned is loaded into the reader at the extreme left in the figure. This unit feeds the information directly to the computer, which, after making the necessary calculations, passes signals to the tape-punching desk. On this unit, the tape is automatically punched and reeled, and at the end of the operation is ready for insertion in the tape reader of either of the two Cincinnati machines. The complete computer installation is housed in a special department, which has office accommodation for the programming staff, also space for Hollerith card sorting and collating equipment.

## EVALUATION OF 12 MONTHS' OPERATING EXPERIENCE

In connection with the application of any new technique, a detailed analysis of production times, costs, and other factors, based on a reasonable

**Fig. 3. This complex forked component is typical of workpieces which are machined in small and medium-size batches under tape control**

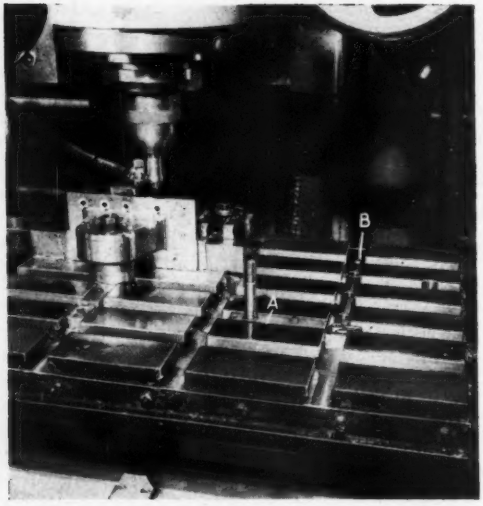



**Fig. 4. Close-up view of the special sub-table provided to facilitate setting up components to be machined under punched-tape control**

length of operating experience, is of great importance, and the value of such an analysis is considerably enhanced if the results can be related to those obtained with the previous method of manufacture, so that savings can be measured. An evaluation of this type, based on 12 months' experience of numerically-controlled machining, has been carried out by the company, and covers the production of a total of 1,769 components made up of 118 different batches. The numbers of parts per batch ranged from 1 to a maximum of 181, and the statistics relate to a total of 70 different designs of parts.

The workpieces shown set-up on the smaller of the two Cincinnati machines in Fig. 2 and 3 and on the larger machine in Fig. 4, are typical of the types of parts which were covered by the investigation. In Fig. 2 is seen a gear casing in which the nominally-oval interior, and the off-set bore at the right-hand side, are machined from the solid under tape control. The complex forked workpiece in Fig. 3 is also typical of aircraft components which are required in small quantities, as is the hinge bracket in Fig. 4, of which 22 per batch are required.

From the detailed records accumulated over the period of 12 months, the company was able to summarize the totals of pre-production times and tool and component manufacturing costs as compared with the corresponding figures for conventional vertical copy-milling machines. These summaries are shown in Table 1, which is largely self-explanatory. It will be noted that substantial savings resulted from reductions in pre-production times and tooling costs, as might be expected, whereas in terms of actual machining time the copy-milling process is quicker.

Substantial savings have also been obtained as a result of the elimination or reduction of hand-finishing on components. It has been found that the standard of surface finish obtained with the E.M.I.-controlled machines is consistently higher than that achieved with the company's conventional milling and profiling machines, with the result that little or no bench-finishing is required, and sharp corners and burrs can readily be removed by barrel finishing.

Detailed records of bench-finishing times were not available for each of the 1,769 components considered in the analysis, but a mean figure was obtained from a sample of five workpieces. The figures for bench time for these five parts, in the

TABLE 1. TABLE SHOWING SUMMARY OF COMPARISONS OF PRE-PRODUCTION TIME AND TOOL AND COMPONENT MANUFACTURING COSTS OVER A PERIOD OF 12 MONTHS FOR MACHINING OPERATIONS WITH TAPE-CONTROLLED AND CONVENTIONAL EQUIPMENT

| Summaries | Components produced by using E.M.I. tape-controlled vertical milling machines | Components produced on standard vertical copy-milling machines |
|---|---|---|
| *Pre-Production Time:* | | |
| Tape preparation time: | | |
| Planning office | 55·33 hours | — |
| Tool designs (18) | 30·00 hours (1 tool) | 350·00 hours (17 tools) |
| Tool estimating | 2·00 hours | 16·1 hours |
| Tool Order Dept., clerical | 4·00 hours | 50·0 hours |
| Planning time | Common | Common |
| Total pre-production time (less planning) | 91·33 hours | 416·1 hours |
| *Tool Manufacturing Costs:* | | |
| Computer (preparation of tape) | 6·20 hours | — |
| Tool production (shop tools) | 195·75 hours | 1,637·00 hours |
| ,, material cost | £13 10s. 0d. | £78 0s. 0d. |
| Total tool manufacture, time and cost | 201·95 hours £13 for material | 1,637 hours £78 for material |
| *Component Manufacture:* | | |
| No. of components machined | 1,769 | |
| No. of batches | 118 | |
| Actual time taken | 3,331·26 | 1,845·0 (estimated) |
| Allowance for contingencies (30 per cent) on actuals | — | 615·0 |
| Time taken | 3,331·26 | 2,460·0 |

TABLE 2. COMPARISONS OF BENCH-TIMES REQUIRED FOR HAND-FINISHING SIMILAR PARTS PRODUCED BY NUMERICALLY-CONTROLLED AND CONVENTIONAL METHODS

| Component | Bench time (min. per part) | | No. off | Saving per part (min.) | Saving over 12 months (hours and min.) |
|---|---|---|---|---|---|
| | Conventional machining | Numerically-controlled machining | | | |
| A | 50 | 20 | 29 | 30 | 14 30 |
| B | 50 | 20 | 9 | 30 | 4 30 |
| C | 60 | 40 | 141 | 20 | 47 0 |
| D | 60 | 40 | 181 | 20 | 60 20 |
| E | 9 | — | 15 | 9 | 2 15 |
| | Total ... ... ... | | 375 | — | 128 35 |

form of a comparison between numerically-controlled machining and conventional machining, are set out in Table 2. The mean figure obtained from this table is 20 min. per part, which, when related to the 1,769 components considered in Table 1, gives a total time saved in bench finishing operations of approximately 590 hours.

## SPECIAL WORK-TABLES FOR THE CINCINNATI MACHINES

A general view of the larger of the two Cincinnati machines is shown in Fig. 5, where the E.M.I. control unit can be seen at the extreme left. The only major modification which Short Brothers & Harland have made is the provision of special sub-tables, which are secured directly to the working surfaces of the standard machine tables. These sub-tables have certain locating and datum surfaces which greatly facilitate setting-up workpieces in relation to the zero positions. One of the sub-tables can be seen on the machine in Fig. 5, and it is shown more clearly in the close-up view in Fig. 4.

The sub-table, which measures 18 in. wide by 41 in. long, incorporates a number of accurately-spaced longitudinal and transverse T-slots, each of which is 1·000-in. wide at the throat. In the longitudinal direction, the T-slots are spaced at 6·000-in. intervals, and in the transverse direction at 3·000-in. intervals. At each intersection of the longitudinal and transverse T-slots (with the exception of those nearest the operator), a 0·625-in. diameter bore, hardened and ground bush is provided, the top edge of which is flush with the bottom of the T-slot.

For use with the table, there is a number of long T-shaped blocks, as indicated at *A* in Fig. 4. Each block incorporates an accurately reamed hole, to receive a ground dowel pin which projects below the bottom surface of the block and will enter any of the bushes in the sub-table. Projecting from the upper surface of the T-block, at a known distance from the dowel hole, there is a pin which is arranged to enter a bushed hole provided in the fixture which holds the workpiece. In each T-block, at the longitudinal centre, there is also a tapped hole, in which a grub screw is inserted. When this screw is tightened against the floor of the T-slot in the sub-table, the T-block is thrust upwards and is thus securely clamped in the required position.

The zero position on the sub-table is represented by the small dowel *B*, and it will be appreciated that the position of any bushed hole in the table can readily be expressed in the longitudinal and transverse directions from this dowel, in increments of 6·000 in. and 3·000 in. respectively. This arrangement greatly facilitates setting-up work-

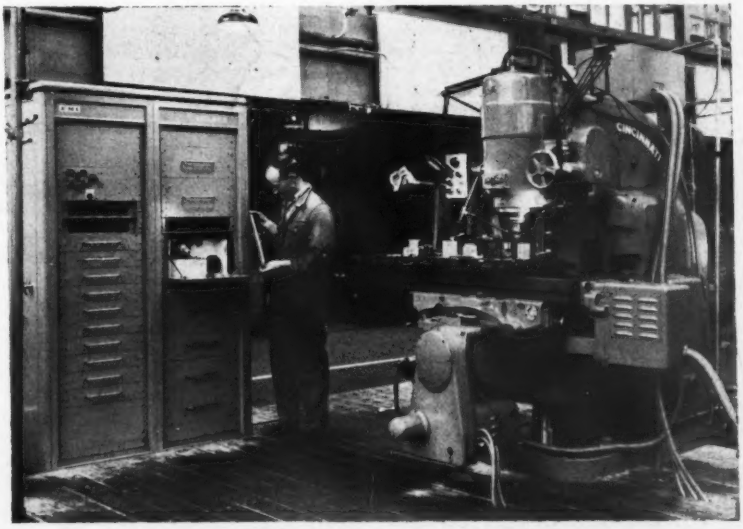


**Fig. 5. General view of the larger of the two E.M.I.-controlled Cincinnati vertical milling machines at the Queens Island works**

| CONTRACT | DRAWING NO: | CODE: | PROGRAMME NO: | SHEET |
|---|---|---|---|---|
| | ISSUE: | | E.M.I.P. ISSUE: | OF |

PROGRAMME INSTRUCTIONS:

(Information concerning locating and clamping arrangements for the workpiece, position on table relative to datum, cutter diameter compensation, zero shift, etc.)

| CUTTER PATH SECTION | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| CUTTER DIA. (IN.) | 3/4 | | | | | |
| TYPE OF CUTTER | H.S.S. | | | | | |
| CUTTER SPEED | 1045 | | | | | |
| TABLE FEED (IN./MIN "X" & "Y") | 6 | | | | | |
| TYPE OF CUT | R/F | | | | | |
| FIXTURES | STD. | | | | | |
| INTERPOLATOR SPEED (SPANS/MIN.) | 12 | | | | | |
| BACKLASH ELIMINATED | ✓ | | | | | |

| PROGRAMME BY: | | DRAWING NO: | PROGRAMME NO: |
|---|---|---|---|
| MECHANICAL: DATE: | NUMERICAL: DATE: | ISSUE: | E.M.I.P. ISSUE: |

PROGRAMME DETAIL SHEET — E.M.I. TAPE CONTROLLED MILLING M/C.
M/C. SHOP PLANNING OFFICE. — SHORT BROS. & HARLAND LTD. BELFAST

**Fig. 6. Reproduction of the form which has been designed by the company to facilitate mechanical programming**

pieces, since the position from the zero is known accurately and can readily be accommodated in the subsequent programming procedure.

## SOME ASPECTS OF PROGRAMMING PROCEDURE

The programming staff which serve the two Cincinnati machines were recruited from the company's planning personnel, and each has sound practical and theoretical experience of workshop practice and of the application of trigonometry to workshop problems. Although the great majority of the trigonometrical calculations are undertaken by the DEUCE computer, there are infrequent occasions when the latter is not available, during routine maintenance, for example. At other times, short tapes are required for which the setting-up of a computer programme is not justified. In these circumstances, the necessary calculations are carried out by the programming staff, with the aid of desk-type calculators, and by procedures which are generally conventional, the tape being punched on a modified Creed tele-typewriter.

For use with the computer, however, the company has developed various procedures with a view to simplifying the setting out of the relevant information, which may broadly be divided into two categories, namely, mechanical and numerical programming. By mechanical programming, is meant the specifying of such information as type of cutter, size of cutter, cutter speed, table feed rate, and type of fixture. Information within this category is set out on special forms which the company has designed, and a typical example is shown in Fig. 6. On this form, many of the headings are self-explanatory, and a number are concerned with the company's internal system for progressing work.

The large open box, at the top of the form, is headed "programme instructions," and the information set down in this space includes, for example: instructions for locating and clamping the workpiece; its position on the sub-table relative to the machine datum; whether cutter diameter compensation is required, and if so, by what amount, whether zero shift is required, and if so, by what amount. The grid portion at the bottom of the form is almost entirely self-explanatory, and the required information is inserted as shown. The entry adjacent to "type of cut" is shown as R/F, which signifies that roughing and finishing cuts are required on the workpiece. Alongside "fixtures" can be seen the entry STD, which is an abbreviation for standard and signifies that the type of tooling equipment shown in Fig. 4 will suffice. The interpolator speed,* in spans per min., is usually that required for the cutter when it is machining the radius on the work which subtends the smallest angle, and this value is entered on the form accordingly.

## THE USE OF CODES TO SIMPLIFY PROGRAMMING

A major step towards reducing the time required to prepare the programme for the computer was made when the company developed a special code system, whereby each of ten common geometrical "shapes" is specified simply by a number. These shapes cover virtually all those likely to be encountered, and once the required shape has been identified it is necessary only to quote the relevant number, and—in most instances—only two or three items of dimensional information. These data are set down on special forms, and the information thereon is subsequently used by an operator to produce a set of Hollerith punched cards. Next, the DEUCE computer, which is set-up to recognize the symbols employed, reads these cards, including the code numbers which specify the

* The interpolator is a device in the E.M.I. equipment which when provided with two successive items of dimensional information automatically calculates intermediate data points.

geometrical shapes required, and performs the necessary trigonometrical calculations. As a result, a continuous stream of numerical data is issued—and is punched in the tape—representing the continuous geometrical shape of the cutter path from start to finish of the cut.

The ten codes developed by the company are set out in Fig. 7, and it will be seen that there is a code (or programme) number, a simple sketch, representing the "shape", and an "information required" column for each shape. Considering programme No. 1, which is a straight line between two co-ordinates, it will be observed that the information required is dependent on the position of the straight line relative to the complete shape of the workpiece. If the straight line is the "start" of the peripheral shape, then the co-ordinates at the start and finish of the line must be specified. In the event of the straight line being elsewhere on the perimeter, then the end co-ordinate only need be specified, since the starting co-ordinate is provided by the end co-ordinate of the preceding "shape". It should be mentioned here that "co-ordinates" implies that dimensional information is required in the $x$ and $y$ axes, originating from the datum point.

If the straight line is *not* parallel with either the $x$ or $y$ axis, then the computer will make the necessary trigonometrical calculation—from the co-ordinates provided—to determine the angle of the line.

In considering one further example, since Fig. 7 is largely self-explanatory, it must be explained that two other auxiliary codes are employed. A straight line "shape" is always represented by a 1, and a circle—or part of a circle—by a 2. It will be appreciated that the "sense" of the circle must also be defined, that is, whether the cutter is to proceed in a clockwise or anti-clockwise direction. It was therefore established that the code 2 should represent movement around a circle in an anti-clockwise direction, and −2 movement in a clockwise direction.

Referring to programme 5, Fig. 7, it will be seen that the shape involved here is that of a straight line tangential to a circle. All that requires to be specified are co-ordinates of the centre of the circle, the radius of the circle, and the sense of the circle—that is, clockwise or anti-clockwise.

## A TYPICAL APPLICATION OF THE SYSTEM

The procedure for programming with this system can best be explained with reference to an imaginary workpiece, and it is assumed that it is required to mill the periphery of a plate to the shape shown by the solid line in Fig. 8. In this figure, the path of the cutter is indicated by the dotted line. The workpiece is located on the subtable so that the centre of the ¼-in. radius (which is the datum point for all dimensions on the work) is 10·000 in. on the $x$ axis, and 5·000 in. on the $y$ axis, from the origin point. A 1·000-in. diameter cutter is employed, and the cut is arranged to start at the point $A$ and to finish at the point $H$, movement being in a clockwise direction around the work. It will be noted that both the starting and finishing points $A$ and $H$ provide for the periphery of the cutter to be well clear of the work.

Firstly, the periphery is divided into a number of "sections", namely $A$-$B$, $B$-$C$, $C$-$D$, and so on. These letters represent the points at which there

| Prog. No. | Shape of section | Information required | Prog. No. | Shape of section | Information required |
|---|---|---|---|---|---|
| 1 | B, A — Straight line between two co-ordinates | Start and end co-ordinates if initial shape. End co-ordinates only if intermediate section. | 6 | α, θ — Two intersecting straight lines | Slope of each line. End co-ordinate of 2nd. line |
| 2 | Straight line oblique to circle at 1st. intersection | Slope of straight line. Centre and radius of circle. | 7 | Circle followed by common tangent | Centres and radii of circles. Sense of circles |
| 3 | Straight line oblique to circle at 2nd. intersection | Slope of straight line. Centre and radius of of circle. Sense of circle | 8 | Circle followed by straight line at 2nd. intersection | Centre and radius of circle. Slope of line. Any co-ordinate on line. Sense of circle |
| 4 | Circle followed by a tangent | Centre and radius of circle. End point of tangent. Sense of circle | 9 | Circle followed by oblique line at 1st. intersection | Centre and radius of circle. Slope of line. Any co-ordinate on line. Sense of circle |
| 5 | Straight line tangential to circle | Centre and radius of circle. Sense of circle. | 10 | B, θ, $B_1$ — Two consecutive circular arcs considered as 3 shapes | Point B (calculated at tangential point of circles) $B$-$B_1$ assumed to have no length. Slope of $B$-$B_1$. Centres and radii of circles |

**Fig. 7. Each of the geometrical shapes here shown has a number, and this number—with the relevant information indicated in the right-hand column—is all that requires to be specified in the instructions to the punched-card operator**

are changes in direction of the cutter. Reference is now made to Fig. 9, where the form which is employed for numerical programming is reproduced. The top portion of the form is reserved for information connected with the internal system of the company, and is of no relevance here. In the section headed "Initial card" there are three boxes, headed 17-21, 22-26, and 30-31. These numbers refer to similarly identified columns on the Hollerith punched-cards. In other words, columns 17-21 are reserved for dimensional information on the $x$ axis, and columns 22-26 for similar information on the $y$ axis. It will be noted that in the $x$-axis box there is a dimension 11·000 in. and in the $y$-axis box a dimension of 8·500 in., and that these co-ordinates represent the position of the *centre of the cutter* at the start point *A*, relative to the origin point.

(Reference to Fig. 8 will show that the centre of the ½-in. radius is 10·000 in. on the $x$ axis from the origin, so that the position of point *A*, on the $x$ axis = 10·000 in. + ½ in. radius on work + ½ in. radius of cutter = 11.000 in. The position of *A* on the $y$ axis can be determined in a similar manner.) In the third box, headed 30-31, is inserted the total number of separate "shapes" required to complete the periphery of the work, which in this instance is seven.

Turning to the columns headed "Section Cards," it will be seen that each successive section of the periphery of the work (*A-B*, *B-C*, and so on) is set down, and each is given a number in the extreme left-hand column. Section *A-B* is a straight line which is tangential to a circle, and therefore corresponds to programme 5 in Fig. 7. Its shape is a straight line, and it will be remembered that the code for this shape is 1. In the columns headed "programme" and "shape," therefore, at the right of the form, are inserted 5 and 1 respectively. It will be noted that these columns are numbered 51 and 56, which, again, relates them to similar columns on the Hollerith cards.

The next section, *B-C*, forms part of the programme No. 7 in Fig. 7, since it is part of a circle followed by a tangent which is also common to another circle. Here, it is necessary to specify the centres and radii of the two circles, also their senses, and the information relating to the first circular portion is found in columns 32-36 and 37-41 under the main heading "Circle information." The ordinates, of course, relate to the centre of the ½-in. radius, and it should be noted that the radius of 1·000 in. (in the section headed 42-46) is the radius of the *cutter* path.

In column 51 is inserted the programme No. of the shape in question (namely 7), and in column No. 56 is inserted -2, which denotes that a part of a circle is to be machined in a clockwise direction. Section *C-D* is a straight line, but is also tangential to a circle, so the programme No. is 5 and the shape designation is 1. For section *D-E*, the programme No. is 7, and since it is a circle machined in a clockwise direction the shape designation, once again, is -2. The co-ordinates given in columns 32-36 and 37-41 refer to the centre of the ⅜-in. radius, in Fig. 8, and it will be noted that for this portion of the periphery the cutter radius will be 1·125 in. (column 42-46).

From the foregoing it will be obvious how the remainder of the workpiece is covered by the system, but attention is drawn to one aspect of the section, *G-H*. It will be noted that since this section completes the workpiece, the finishing position (the co-ordinates for *H*, Fig. 8) is given in columns 17-21 and 22-26. There is also an entry in the column headed "slope," since the cutter path at the point *G* is required, in effect, to turn through 90 deg. and to produce a sharp corner. The programming

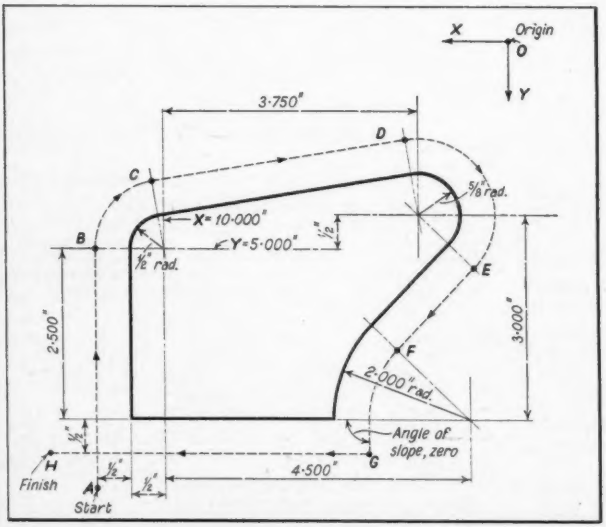



**Fig. 8. The numerical programme for this specimen workpiece is shown in Fig. 9, in the form in which it is received by the Hollerith punched-card operator**

| CONTRACT | COST NO. | COMPONENT NO. | ISS. | PROGRAMME NO. | ISS. | C.P.NO. | SHEET OF: |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| INITIAL CARD. | 17-21 | 22-26 | 30 & 31. |
|---|---|---|---|
| | Xo. = 11·000 | Yo. = 8·500 | No. OF SHAPES. 7 |

| | SECTION CARDS. | END CO-ORDINATE | | SLOPE | CIRCLE INFORMATION | | | PROG. NO. | SHAPE | STOP | ROW FINISH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Xf. | Yf. | $\alpha$ | X.CR. | Y.CR. | RAD. | | | | |
| | COLS. | 17-21 | 22-26 | 27-31 | 32-36 | 37-41 | 42-46 | 51 | 56 | 61 | 66 |
| 1 | A-B | | | | | | | 5 | 1 | | |
| 2 | B-C | | | | 10·00 | 5·00 | 1·00 | 7 | -2 | | |
| 3 | C-D | | | | | | | 5 | 1 | | |
| 4 | D-E | | | | 6·250 | 4·500 | 1·125 | 7 | -2 | | |
| 5 | E-F | | | | | | | 5 | 1 | | |
| 6 | F-G | | | | 5·500 | 7·500 | 1·500 | 8 | 2 | | |
| 7 | G-H | 12·00 | 8·000 | 0° | | | | 1 | 1 | | |

| | PARAMETER CARDS. | ORIGIN OF CO-ORDS. | | SKEW | OPPOSITE HAND | | IN. PER MIN. | SPARE/ MIN. | INITIAL SHAPE | FINAL SHAPE | FINAL STOP. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Xo. | Yo. | $\theta$ | X | Y | | | | | |
| | COLS. | 17-21 | 22-26 | 27-31 | 32-36 | 37-41 | 42-46 | 47-51 | 55/6 | 60/1 | 66 |
| | A-H | 0 | 0 | 0 | 0 | 0 | 6 | 12 | 1 | 1 | ✓ |

PREPARED BY: CHECKED BY: DATE:

MACHINE SHOP PLANNING OFFICE: SHORT BROS. & HARLAND LIMITED.

**Fig. 9. Reproduction of the form designed by the company to facilitate numerical programming. Information included on this form is transferred to Hollerith punched-cards, which are subsequently used to feed instructions to the DEUCE computer**

system is designed to read the quadrants of a circle in a clockwise direction, with zero on the $x$ axis as shown in the sketch at the top right-hand corner of Fig. 8. Consequently, the cutter path required to produce the section *G-H* represents 0 deg. of slope, whereas if the cutter was required to proceed in the opposite direction (that is, to the right) the angle of slope would be 180 deg.

The final stop is governed by the entry *A-H*, under the heading Parameter Cards, which denotes the designations of the first and last sections. Most of the headings at the bottom of the form in Fig. 9 are self-explanatory, but reference may be made to the heading "skew." In the aircraft industry it is sometimes the practice to prepare working drawings in which the part to be produced is shown in the position it will take up when assembled in the airplane. For example, a part may be drawn set at an angle to the horizontal, since in flight it will be in this position relative to the longitudinal centre line of the aircraft. If the angle of skew on the drawing is included in the lower section of the form Fig. 9, then allowance is made by the computer for this mis-alignment.

It is assumed that as-drawn versions of the component shown in Fig. 8 are required only, and zeros are therefore inserted in columns 32-36 and 37-41 at the foot of the form. For opposite hand components, however, a figure representing (Programming Centre × 2) is entered for the axis about which the part is required to be handed. The computer then automatically subtracts the required $x$ or $y$ ordinates for the change points from this figure. For example, to produce a mirror image of the component shown in Fig. 8 about the $x$ axis, the position of each change point would be $(2 \times 10 - x)$, the value $x$ being the relevant drawing dimension.

If it is required to machine two consecutive circular arcs, as shown in programme 10, Fig. 7, certain difficulties may be encountered. Basically, the problem is to define, from the standpoint of the computer, the point at which the two curves are tangential, namely, the precise point at which the cutter path changes direction. This problem has been overcome in an ingenious manner, in that the complete shape is considered as three separate components. To facilitate computing, the shape is assumed to be two circles, of opposite senses, which are intersected at the point of tangency by a line of zero length.

In effect therefore, the programme is designed to provide for the first arc, then for an oblique line at the second intersection (as in programme 8). This line, $B$-$B_1$ in programme 10, is considered to be of zero length, but can be given a direction of slope. In this instance, the angle of slope will be 180 deg. and the next instruction will provide for another arc of a circle. With this arrangement, the consecutive arcs are machined continuously with the point of tangency accurately defined.

---

THE TYPE C SELF-PROPELLED "MOVE-ON" STAGING which has been added to the range made by Anderston Clyde (Midlands), Ltd., Irk Vale Works, Chadderton, Lancs., incorporates the safety features of the company's A and B types, but provides for greater working heights. By means of a single hinged mechanism, the unit can be collapsed when not in use, and then has overall dimensions of 5 ft. 11 in. high by 9 ft. 8 in. long. A solid board platform can be set at various levels from 7 ft. to 12 ft. 8 in. to provide for working heights from approximately 12 ft. 6 in. to 20 ft. Gear drive to the wheels is operated by a handle on the platform, and in conjunction with Ackerman steering gear enables the unit to be moved forward, backward, or round corners.

# Combined Eccentric Boring and Turning Operations

By JÁN CEPEL, Technical University, Kosice, Czechoslovakia

ECONOMIC PRODUCTION under modern conditions frequently requires that multiple operations should be carried out at one set-up on a machine tool, and significant reductions in machining times can often be obtained if several operations can be performed simultaneously on a workpiece. The method for performing combined eccentric boring and turning operations which is here described was originally developed for the production of the "cycloscreen" camshaft of the type which is shown in Fig. 1.

This part incorporates eccentric portions, and requires to be hardened, since on assembly it is mounted on needle roller bearings. With the previous methods employed, production was slow and expensive, but with the new arrangement machining times have been reduced to about one-tenth of those originally required.

The new method has also been applied successfully to the production of Howden compressor casings, and for the gear pump housing shown in Fig. 2. On such components, the elliptical body and associated flange can be turned simultaneously with the boring of the internal intersecting holes. With the same method, an external circular portion can be turned simultaneously with the boring of an eccentric hole, as shown in Fig. 3, and with the portion of a crankshaft shown in Fig. 4 it was possible to bore the crank-pin hole *a* and to turn the shaft member *b* at the same time. Fig. 5 shows a workpiece on which the holes were drilled simultaneously with the turning of the outside

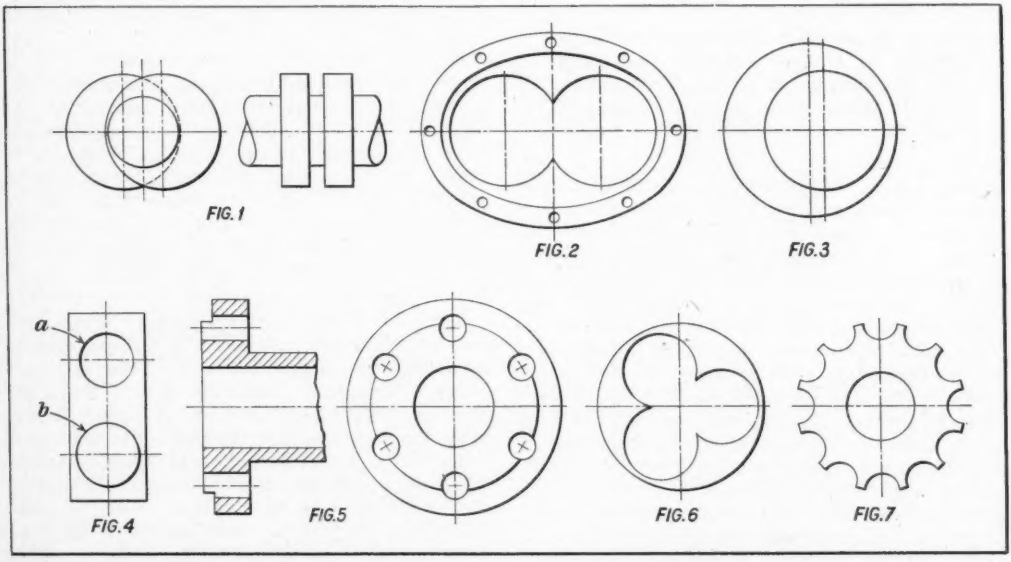



Fig. 1. "Cycloscreen" shaft with opposed eccentrics
Fig. 2. A Howden type compressor casing
Fig. 3. A disc with an eccentric hole
Fig. 4. Crank web with hole and integral pin
Fig. 5. A clutch disc or flange with holes on a pitch circle
Fig. 6. A "trefoil" shape which can be machined by the methods here discussed
Fig. 7. A "sprocket" form to be machined

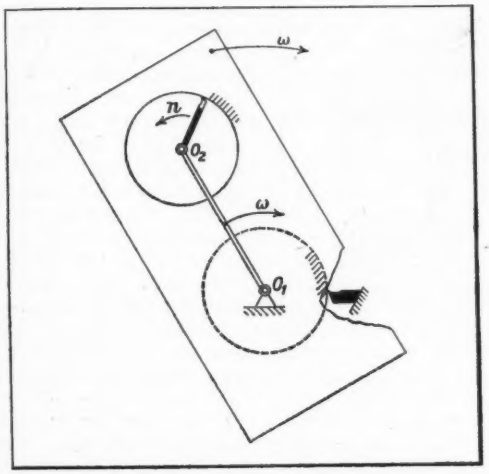



**Fig. 8. Arrangement for simultaneously turning a pin and boring a hole in a crankshaft component**

surfaces, and similar combined operations could be performed on components of the shapes shown in Fig. 6 and 7.

The principle of operation can best be described by reference to a simple example, and it is proposed to discuss the procedure for machining the part indicated in Fig. 4. A diagrammatic representation of the set-up is shown in Fig. 8, where the workpiece is set to rotate about the centre $O_1$ at a speed ω, and a conventional turning tool is applied to machine the periphery of the shaft portion, in the orthodox manner. The arm $O_1$-$O_2$ also rotates about the centre $O_1$ and is driven in precise synchronism with the workpiece, namely at a speed ω. The length of the arm is equal to the centre distance between the shaft portion and the hole to be bored. A tool-holder pivoted on the centre $O_2$ is driven at a speed $n$, which is that required to give a cutting speed to suit the material being machined. It will be obvious that with this arrangement, the hole and the shaft portion are machined simultaneously, but that the boring tool must approach the work from the side opposite to the shaft portion, in order to avoid interference with the plain turning tool as the arm $O_1$-$O_2$ rotates.

In practice, the set-up would be of the type shown diagrammatically in Fig. 9 and 10, where the former represents the combined boring and elliptical turning of a gear-pump housing or a Howden compressor casing. Fig. 10 shows how a similar mechanism can be employed for boring eccentric holes, to receive roller bearings, for example, at the same time as the elliptical periphery of the part is being machined. The mechanism for machining the ellipses will be discussed later.

In Fig. 9, the work is set to rotate about the centre $O_1$, and coaxial with the latter there is a fixed spur gear $Z_1$. An arm $O_2$-$O_2$ is pivoted at its mid-point on the centre $O_1$, and is driven at a

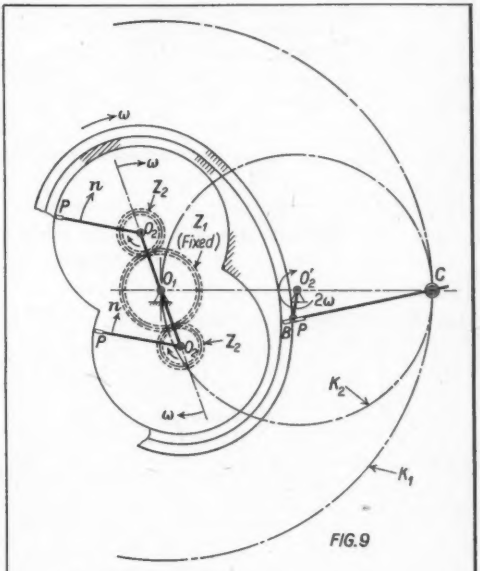



FIG.9

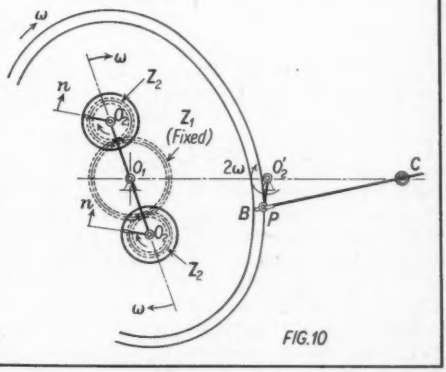



FIG.10

**Fig. 9. Diagram showing the principle of an arrangement for machining a Howden type compressor casing**

**Fig. 10. Diagram showing an arrangement for boring eccentric holes and turning an ellipse**

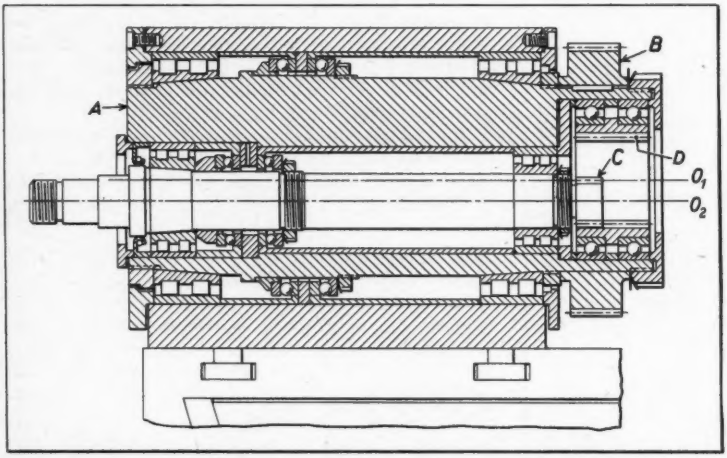



**Fig. 11. Sectional view of a head for eccentric boring operations on rotating workpieces**

speed equal to that of the work, namely $\omega$, and in the same direction. At each end of the arm there is a spur gear $Z_2$, which is in rolling mesh with the fixed gear $Z_1$, and serves to drive a tool-holder and tool, as at $P$. It will be obvious that the tool-holders $P$ must be set initially in the angular relationship shown, in order to avoid interfering with each other during the machining of the intersecting bores in the work. The set-up shown in Fig. 10 is basically similar, except that the two eccentric bores being machined are separate, and do not intersect as do those shown in Fig. 9. The ratio between the fixed gear $Z_1$ and the planet gears $Z_2$ in each set-up is arranged to give a rotational speed of the tool-holders in accordance with the surface speed at which the work material can be machined.

It will be appreciated that with this type of mechanism, the precise synchronization of the rotation of the arm $O_2$-$O_2$ with the rotation of the workpiece is of major significance, since any cyclic differences in the angular velocities of these two members will result in non-circular holes being bored. If possible, a direct drive between the two members should be arranged—that is, a positive connection should be made between the casing which holds the two planet gears and the workpiece or work-table—and the use of a gear transmission to provide this drive should be avoided whenever practicable. Similarly, high-precision gears (preferably of the helical type) should be employed at $Z_1$ and $Z_2$, since errors resulting in non-uniform angular velocity, or eccentricity, in this drive will adversely affect the accuracy of the bored holes in the work.

For machining components with a fairly small amount of eccentricity, as in Fig. 3, for example, the experimental boring head shown in Fig. 11 was designed. The rotating members are mounted on series NN30K/SP Skefko bearings, for which the run-out does not exceed $\pm 2$ microns ($\pm 0{\cdot}00008$ in.). For boring the holes in the head and quill, a SYPKA 2450 jig boring machine was used, on which holes with centres accurate to $\pm 1$ micron ($\pm 0{\cdot}00004$ in.) can be produced.

Referring to Fig. 11, the quill $A$ is mounted in anti-friction bearings, in a suitable housing, and is driven in synchronism with the workpiece by means of an external gear $B$, which is keyed to the right-hand end. In operation, the quill rotates about the centre indicated at $O_1$. The cutter spindle, however, is mounted eccentrically within the quill, on the centre $O_2$, and has a small pinion $C$ at the right-hand end. This pinion is arranged to mesh with an internal gear $D$, which is carried in anti-friction bearings in the quill $A$ and is free to rotate about the same centre as the latter, namely, $O_1$.

With one method of operation, the internal gear $D$ is held stationary, by means of a gear-type coupling, which engages with the internal teeth and is secured to some fixed part of the machine. As a result, the rotation of the quill causes the gear $C$ to roll round inside the gear $D$, and the speed of rotation of the spindle about the centre $O_2$ is then proportional to the numbers of teeth in the two gears. Alternatively, the gear $D$ can be driven from an external source—for example, a variable-speed electric motor—and with this arrangement the speed of rotation of the cutter spindle can be varied to provide the optimum cutting speed for the material being machined. The head shown in Fig. 11 was built for experimental purposes, and for this reason provision was made for wide variation of cutter spindle speed.

The formation of an ellipse on the basis of hypocycloidal motion is indicated in Fig. 12. Here the circle $K_2$ rolls inside the circle $K_1$, the ratio

$R_1/R_2$ being equal to 2. The tracing point $P$, however, lies within the smaller circle so that it traces an ellipse. The general type of curve thus traced is the hypotrochoid, but with $R_1/R_2 = 2$, the result is an ellipse, as may be proved by comparing the parametric equations of hypotrochoid and ellipse.

By a suitable inversion of the mechanism, the arrangement shown in Fig. 13 is obtained. This mechanism was suggested by the fact that, at every point of the trochoid, the normal passes through the momentary point of rolling. Thus, the tool holder can be kept normal to the elliptical surface produced, to maintain the correct position between the tool and the workpiece during machining. The point $B$ lying on the normal will describe an ellipse of which the profile will be everywhere equidistant from that of an ellipse described by any other point on $PC$. Consequently, an elliptical flange step, for example, can be machined.

Also indicated in Fig. 13 is a graphical method of determining speed. The line joining the speed vector at the point $P$ with the centre of curvature indicates the magnitude of speed at all points on $CP$ and $CP$ produced. The centre of curvature $S_p$ of the point $P$, and of all similar points, is found in the following manner. $CE$ is drawn at right-angles to $CP$ and intersects the crank line $PO'_2$ at $E$. This point is joined to the centre $O_1$ and the line $E\ O_1$ is continued to cut $CP$ in $S_p$. Taking $CP$ as a measure of the speed of $P$ with respect to $C$, i.e. $v_C^P = CP$, $PL$ is made equal to $CP$ and $L$ is joined to $S_p$. The speed at any other point, such as $v_C^B$, may then be found.

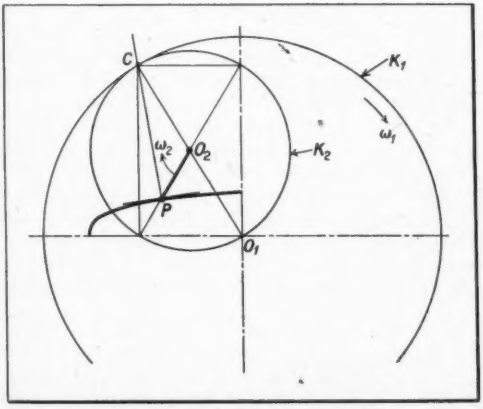



**Fig. 12. Diagram showing how an elliptical form is obtained if the ratio of the circle radii is 2 and the point P lies within the smaller circle**

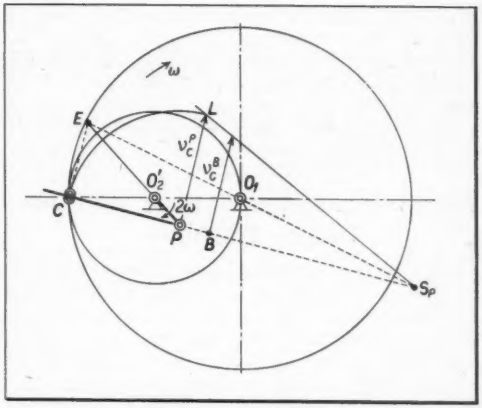



**Fig. 13. Diagram showing the arrangement whereby the tool is kept normal to the surface of the ellipse during machining**

The calculation can also be carried out by normal kinematic methods. In this instance, however, it was necessary to make such determinations for a whole sequence of positions of the mechanism, and a rapid graphical method was essential.

The application of the principle shown diagrammatically in Fig. 12 and 13, is indicated—also diagrammatically—in Fig. 9 and 10, for machining the elliptical peripheries of the workpieces. In Fig. 9, the large and small circles $K_1$ and $K_2$ are shown (as in Fig. 12) and the ratio of their radii is 2. The circle $K_1$ is struck from the centre $O_1$, that is, the centre of rotation of the workpiece, and the periphery of the circle $K_2$ passes through the centre $O_1$, since $R_1/R_2 = 2$. From the foregoing explanation it will be evident that if the arm $O'_2P$—which is the tool-holder—is driven in synchronism with, and at twice the speed of, the workpiece, then the point of contact of the tool $B$ will describe an elliptical path in relation to the workpiece.

It will be noted that in Fig. 9 and 10, the tool-holders are equipped with two tools, one in advance of the other, and with this arrangement a stepped periphery—comprising two "parallel" ellipses—is machined on the work.

The principle of performing multiple operations at one set-up can be extended to include hardening. For this operation, an induction hardening coil is substituted for the tool, and the various moving parts are operated as for machining. After hardening, finishing operations are carried out with a diamond tool, at a very fine feed rate, instead of grinding in the conventional manner.

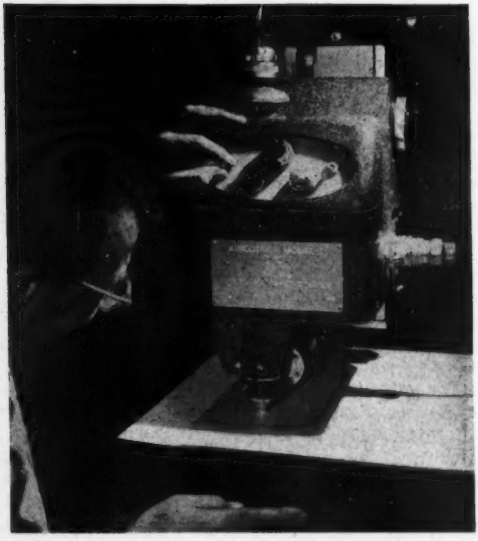
Mention may be made of an additional advant-

age which is derived when the combined machining method is employed for parts such as the drilled flange shown in Fig. 5. In a batch of such workpieces, all the holes in the flanges will be identical with respect to angular and radial spacing, thereby ensuring complete interchangeability.

## Photo-electric Tracer Head for Flame Cutting Machines

The type J photo-electric tracer head shown in the figure has been introduced by Air Reduction Co., Inc., U.S.A., for control of burner carriage movement on flame cutting machines. It is claimed to offer advantages for non-repetition work where it is necessary to keep the cost of templates to a minimum. The head operates from a drawing on which the width of line should be maintained between 0·02 and 0·04 in., and it is stated that operation is not affected by extraneous light. Cutting speeds obtainable normally range from 5 to 24 in. per min., but higher or lower speeds can be obtained with different driving motors, and it is claimed that 90-deg. square corners can be traced.

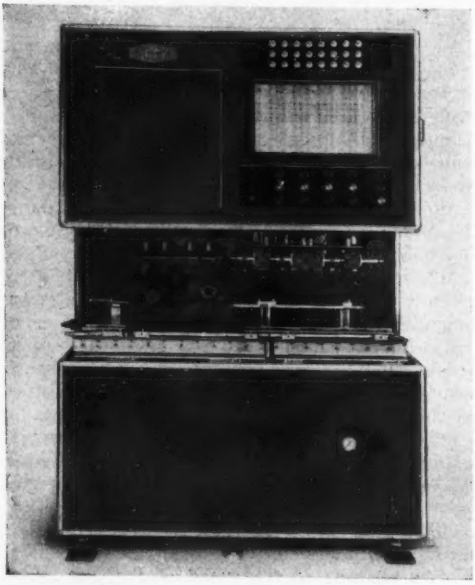
As will be observed, a control panel is incorporated in the head, which can be supplied with either hand or power motion for raising and lowering.



**Aircotron type J photo-electric tracing head for flame cutting machines**

## Solex Gauging Unit for Cylinder Bores

In the accompanying illustration is shown an air-gauging unit which has recently been supplied



**Solex air-gauging unit for motor car cylinder bores**

by Solex (Gauges), Ltd., 72 High Road, Chiswick, London, W.4, for checking the piston bores of a 4-cylinder motor-car engine block. It is designed for installation in a conveyor line, and incorporates a brushing station, seen on the left, for cleaning the bores in preparation for gauging.

The cycle is initiated automatically, when the cylinder block trips a switch as it moves along the conveyor into the gauging unit. Upon completion of the brushing operation, the block is transferred to the gauging station, at the right, where the Solex multi-jet plug gauges are automatically lowered into the bores. There are six jets for each bore, which check diameter, roundness, and parallelism.

From the readings on the water-column scales, the gradings of the cylinder bores are noted, and by the operation of a push-button, an automatic stamping cycle is initiated for marking the block with the required code symbols. Another push-button provides for raising the plug gauges, and the block is transferred to a section where pistons of the required grade are assembled.

# Making Spare Parts for Oil Well Equipment

## Typical Set-ups and Equipment Employed at the Works of the Mission Manufacturing Co., Ltd., Castlereagh, near Belfast, Northern Ireland

By A. W. ASTROP, Associate Editor

TWO OUTSTANDING REQUIREMENTS for oil-well drilling equipment are that it should be capable of withstanding extremely heavy loads, invariably under unfavourable conditions, and of being maintained in virtually continuous operation, since, for a variety of reasons, interruptions in drilling, once it has been started, are highly undesirable. It follows, therefore, that whereas every effort is made to ensure that the design of the equipment, and the materials used, are equal to the duties imposed, a highly efficient service of replacement parts must also be provided. Moreover, these parts must almost always be fitted on site, and in the shortest possible time, so that complete interchangeability is essential. Requirements in this respect are particularly stringent when the drilling site is in an isolated area, and access to metal-working equipment such as machine tools is either extremely difficult or impossible.

One of the foremost firms engaged in the production of spares for oil-well equipment is Mission Manufacturing Co., Houston, Texas, U.S.A., and in 1956 a subsidiary—the Mission Manufacturing Co., Ltd.—was set up in Northern Ireland. It is interesting to note that this company was the eighth from the United States to start manufacturing activities in the area, and occupies a factory which was built on the Castlereagh estate (to Mission specification) by the Northern Ireland Ministry of Commerce. The estate is about 3 miles from Belfast, and the company's premises at present provide a total covered area of 35,000 sq. ft., of which the production space accounts for approximately 20,000 sq. ft., and the stores area, for about 5,500 sq. ft. Ample storage facilities are of great importance to the company, since a large quantity of finished and crated parts must be held in readiness at all times for immediate despatch to such areas as Venezuela, Africa, and the Middle and Far East.

A major proportion of the company's output comprises parts for oil-well slush-pumps, notably cylinder liners, pistons, piston rods, and valves. It will be recalled that in oil-well drilling, a slush-pump is employed to deliver "mud" in large quantities, and at pressures of the order of 1,500 to 2,000 lb. per sq. in., to the drill point, for cooling purposes and for expelling the mud, rock, gravel, and other substances which collect at the bottom of the bore. The "mud" is a special fluid, the base of which is either water or light oil. A solid constituent is added, usually a bentonite clay, which, in the water or oil has a thixotropic property, thereby increasing the viscosity of the fluid. As a result, the "mud" has enhanced "lifting power" at lower flow rates, and raises cuttings and debris to the surface more efficiently.

It is not always practical, of course, to ensure that the fluid supply is free from matter which is injurious to the slush-pumps, and in consequence these units invariably operate under very adverse conditions. In extreme circumstances, it is necessary to replace cylinder liners, pistons, and valves repeatedly, after a comparatively small number of running hours, whilst drilling is in progress.

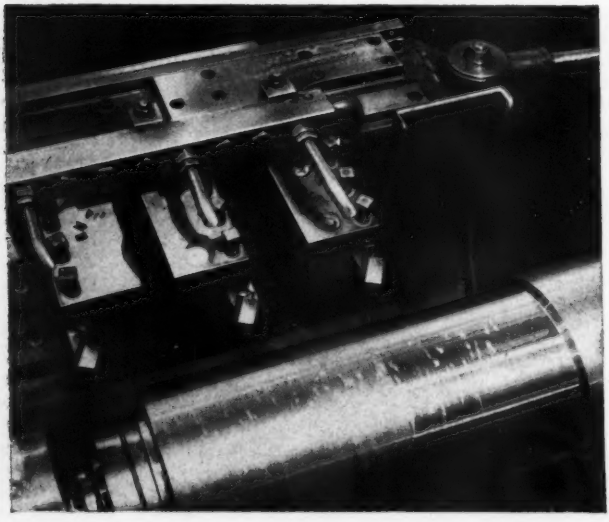
In the case of pistons, for example, the company produces spares for 28 different makes of slush-pumps, comprising a total of several hundred sizes and types, and cylinder liners, piston rods, valves, and other parts are required in similar ranges and diversities. At the Castlereagh works, pistons are made with diameters ranging from 4 to 8 in. (in ¼-in. increments) and with various types and sizes of tapered bores. Mission Filehard and Superchrome piston rods are made with diameters from 1 to 3¼ in., and with a variety of taper-threaded ends to A.P.I. standards, also to customers' special requirements. Cylinder liners range from 4 to 8 in. diameter bore, also in ¼-in. increments and in a variety of different designs.

The equipment installed includes heat-treatment plant, and plating baths for applying hard-chromium for the Superchrome piston rods mentioned above. It may be mentioned, in passing, that it is a company rule that no person is allowed within the production area without wearing safety glasses. Prominent notices are displayed, on the outsides of all doors giving access to this area, to the effect that glasses must be worn "beyond this point," despite the fact that no operations are carried on which might involve a high probability of injury to the workers' eyes.

**Fig. 1. General view of the 75-h.p. Drummond Maximajor lathe which is installed at the works of Mission Manufacturing Co., Ltd., for rough-turning the peripheries of forged steel cylinder liners**

## OPERATIONS ON CYLINDER LINERS

Cylinder liners for slush-pumps are made from 0·5 per cent carbon steel forgings, and the first operation, after receipt at the works, provides for squaring one end on an Ohler (Drummond-Asquith, Ltd.) cold-sawing machine. From this machine, the forgings are delivered to a Drummond Maximajor 75-h.p. heavy-duty lathe (Drummond-Asquith, Ltd.), a general view of which is given in Fig. 1. This machine is basically standard, but incorporates a number of features to the specification of the customer, including power-operated transverse movement of the tailstock, to facilitate loading and unloading the heavy forgings. The lathe is used almost exclusively for rough-turning the outsides of the liners, from the as-forged condition, and has very heavy-section tool-holders and slides. There are two rear tool-slides, arranged for facing the ends of the forgings, and the front tool-slide, which provides for gang-tooling, can be used under the control of a cam track.



As seen at the left in Fig. 1, there is a dovetail slide, on the top surface of which interchangeable strips can be secured to form tracks of various shapes. At the left-hand end of this slide there is a threaded connecting rod, the free end of which can be secured to a bracket attached to the front face of the headstock. When the slide is locked in this manner, and the saddle and cross-slide are traversed beneath it for conventional longitudinal turning, a roller which is carried by a bracket attached to the rear face of the front tool-holder engages with the track. As a result, the tool slide is moved transversely

**Fig. 2. Close-up view, from the rear, of the gang tooling employed on the Maximajor lathe**

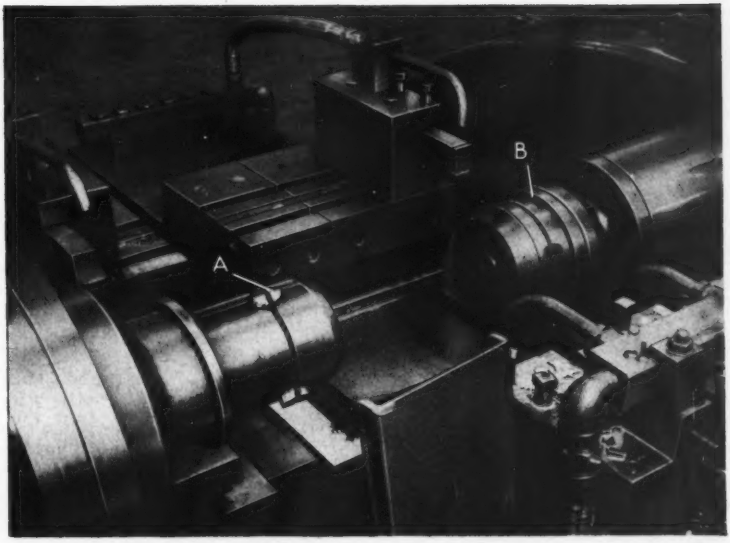



**Fig. 3. This view shows the expanding-type gripper pads which are provided in the headstock and tailstock mandrels on the Drummond machine**

in accordance with the shape of the track, and the work is turned to a corresponding form.

It will be noted that the forging has an enlarged diameter portion at the headstock end, and the attachment just described is employed, for example, to produce a chamfer during the roughing pass, to avoid imposing an excessive load such as would result from an attempt to machine a truly shouldered form. Once the forging has been cleaned up all over, the stock removal is more uniform at the succeeding passes, and the cam track attachment is not required.

For the liner here considered, one front tool-slide only is employed, the right-hand unit being idle, as can be seen in Fig. 1. A close-up view of the front tooling, from the rear of the machine, is given in Fig. 2, where a portion of the cam-track is also visible. Brazed-tip tungsten carbide tools are employed, and the liner shown, which has a 7¼-in. diameter bore and is 28 in. long, is machined at a surface speed of 300 ft. per min. and a feed rate of 0·025 in. per rev.

For gripping the forgings, the headstock and tailstock are fitted with expanding-type mandrels, which enter the bore, and these mandrels can be seen in the close-up view Fig. 3. The headstock mandrel, at the left, is of the air-operated type and has three radially-moving gripper pads, as at A, which are retained by means of a simple "curtain" spring. In the tailstock mandrel, however, the gripper pads are expanded radially by mechanical means, as a result of the axial movement of the quill. For loading a forging, the tailstock is moved transversely to the

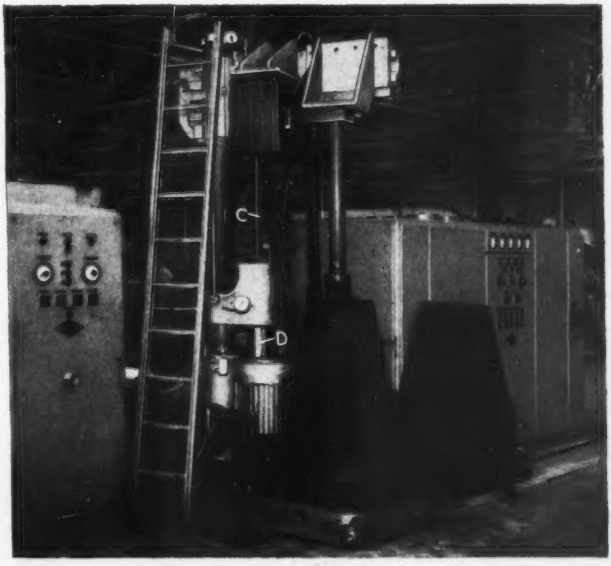



**Fig. 4. The bores of cylinder liners are induction hardened on this German-built E.M.A. fully-automatic machine**

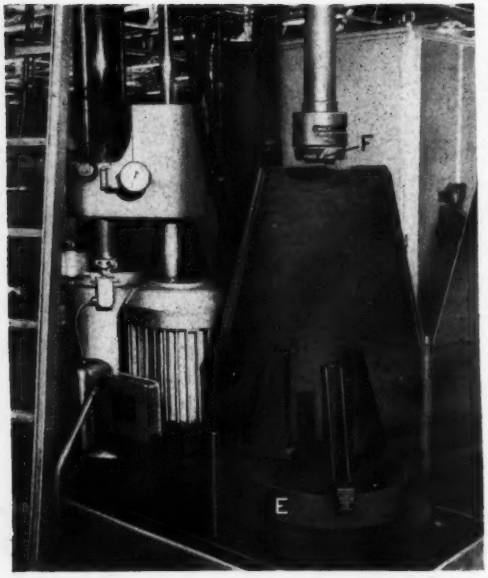



**Fig. 5. Close-up view of the work-table and inductor head on the E.M.A. machine**

rear of the machine and the work can then be delivered by an overhead hoist and threaded directly over the headstock mandrel.

Next, the tailstock is returned to the working position, as determined by a dead-stop on the sub-base, and the quill is advanced by air to introduce the mandrel into the bore of the forging. The quill and mandrel continue to advance until the shoulder *B* on the latter abuts the end of the forging. As a result, the mandrel is arrested but the quill continues to advance. A tapered portion on the shaft which supports the mandrel then contacts the inner ends of the pads, and the latter are moved radially outwards, to grip the work.

The bores of the liners are machined on an adjacent lathe, by conventional methods, and the peripheries are subsequently finish-turned on a Fischer +GF+ copying lathe (Vaughan Associates, Ltd.). Before this finish turning operation, the bores of the liners are hardened and honed, and, for hardening, the company has installed a fully-automatic E.M.A. German-built induction hardening machine (Delapena & Son, Ltd.).

A general view of the equipment is shown in Fig. 4, where it will be seen that in design it bears a general resemblance to a radial drilling machine. There is a cast-iron base with a steel cylindrical column at one end. On this column there is an "arm" which can be raised and lowered hydraulically at a predetermined speed, and the arm has a saddle arranged for movement towards and away from the column, for adjustment purposes. Attached to the under-side of the saddle there is a steel tube, at the free end of which is mounted the inductor head, and the latter can readily be interchanged to accommodate workpieces with different bore diameters.

The piston rod for raising and lowering the arm is indicated at *C*, and its associated cylinder *D* is supplied with pressure oil from a pump and motor set housed in the column base casting. Limit switches, operated by adjustable trip dogs, are provided for reversing the flow of oil to the cylinder *D*, at the required extremes of travel of the arm, and the latter can be swung to one side, as on a radial drilling machine, to allow unobstructed access for loading and unloading the work. The two sheet steel cabinets seen to the left and right of the machine house all the electrical equipment necessary for the fully-automatic control of temperature, water supply, rate of traverse, speed of rotation of the workpiece, and dwell for final quenching-out.

A close-up view of the work-table and inductor head is given in Fig. 5, where the hinged cover which completes the enclosure for the work has been swung to one side. The table *E* is driven by the adjacent vertically-mounted electric motor, and is, in effect, a 3-jaw self-centring chuck. Cast extension pieces are secured to the jaw slides, to ensure that the liner is held truly vertical, and at the start of the operation, the inductor head is lowered into the bore to a position just clear of the upper surface of the work-table. Next, the hinged cover is closed, to provide complete protection for the operator, and the automatic cycle is started.

With the work rotating, current is supplied to coils within the head and the water supply is switched on. The head is drawn slowly upwards, through the workpiece, the depth of hardening depending on the speed of traverse. Tungsten carbide steady pads on the periphery of the head bear lightly against the bore of the work, and there are four helical blades, as at *F*, which deflect the quenching water and ensure that it is evenly distributed around the periphery. For each type and size of liner which is produced, there is a comprehensive instruction card giving details of the cycle required to produce a given case depth.

### HONING CYLINDER LINERS

After they have been hardened, the liners are passed to one of the two Fulmer vertical honing machines seen in Fig. 6. Built under licence by

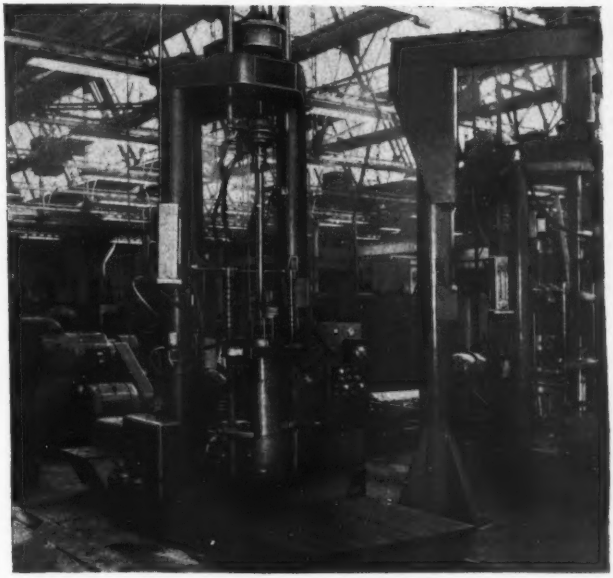


**Fig. 6. A pair of British-built Fulmer automatic honing machines are installed for operations on the bores of cylinder liners**

Perfection Engineering Co. (Coleshill), Ltd., Station Road, Coleshill, Warwickshire, these machines operate on a fully-automatic cycle, and that seen at the centre of Fig. 6 is of the latest design. A feature of this machine is the provision of a traversing table, which can be withdrawn from the working position, towards the operator, to enable the liners to be loaded and unloaded vertically, with the aid of the fabricated jib crane seen at the right. The machine has a 3-ft. stroke, and operates on a timed cycle, which can be pre-set according to the amount of metal to be removed. Surface finish required for the liners is of the order of 16 micro-inches, and the honing head incorporates six stones, each of which is ½ in. square by 6 in. long and is attached to the holder by means of shellac.

The reciprocating movement is imparted to the honing head by a double-acting oil hydraulic cylinder, and the stones are expanded by a cone member within the head which is moved axially by a screw. This screw is rotated by a hydraulic motor which is mounted coaxially with the tube which holds the head, at the upper end. A close-up view of the working area, with a liner in position, is shown in Fig. 7, where the main control panel can also be seen at the right. The liner is located by the periphery in a pot-type fixture carried on top of the air-operated table.

This fixture is arranged for vertical movement, also by air, and in this manner the liner is lifted bodily and thrust firmly against the under-side of the bridge-member *H*. Provision is made for setting the height of the bridge, to suit liners of different lengths, by means of the grooved

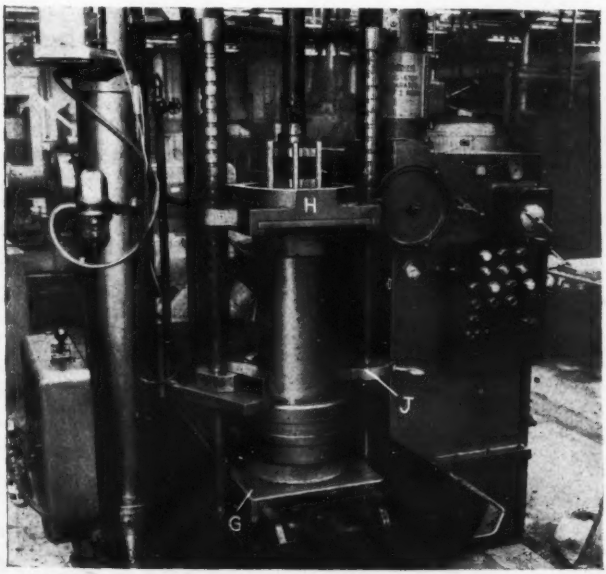



**Fig. 7. Close-up view of a liner in position on one of the Fulmer machines. The work-holding fixture and slide can be traversed towards the operator to facilitate loading and unloading by crane**

pillars seen at either side, split collars being assembled with the required grooves in each pillar to form abutment shoulders. The liner is prevented from rotating during honing by the cam-shaped members *J*, which are pivoted about the grooved pillars. These cams are serrated, to grip the liner, and they are swung into position and pulled tight by the handles provided. Any slight turning movement of the liner increases the grip of the serrations.

When the honing cycle has been completed, the drive is automatically switched off and the hone is withdrawn from the liner and retained in the uppermost position. After unlocking the cams, the lever-type valve seen projecting from the cover at the left is operated, with the result that the fixture is lowered, to bring the top of the liner well clear of the bridge *H*. Air is then applied to move the slide *G* to the forward position, and the liner can be lifted clear by the crane. For the machine shown in Fig. 7, a De Laval Turbomatic Centrifuge type BX215-343 separator is employed, to clarify the honing fluid, and this function is performed for the neighbouring machine by a Philips paper-band type unit. The bore of each liner is checked for size, roundness and parallelism, while in position on the machine, by means of the Sheffield air-gauging equipment seen attached to the left-hand column in Fig. 6 and 7.

## OPERATIONS ON ROLLING DOG SLIPS

In connection with oil-well drilling, provision must be made for raising the drill tube—to replace the bit, for example—and for this operation a unit is employed which is similar in design to a collet. The unit is split, and hinged, so that it can be opened and then wrapped round the drill tube, and incorporates a number of arcuate segments. On the concave portions of these segments, which are of such a size that they fit the tube, there are serrations, which serve to bite into the surface and ensure a firm grip. The design of the segments and the carrier is such that under the weight of the tube they "roll" slightly, and this action serves to press the serrations into the surface. In most designs, there are three stacks of segments, spaced equally within the carrier, and there are between 12 and 20 segments per stack, depending on the type and size.

A typical segment—or rolling dog slip, as it is termed—is seen in position in a checking gauge in Fig. 8, with the master segment, whereby the gauge is set, in the foreground. These rolling dog slips are made in very large quantities at the Castlereagh works, in a wide range of types and sizes, and that seen in Fig. 8 is typical of the various designs. The serrations in the arcuate portion can clearly be seen, and it will be noted that the end faces are machined at an angle and that there is a radius along the edge nearer the camera. The gauge here shown is employed to check that the arcuate portion is in the mid-position between the two end faces. In use, the dog slip is placed in the gauge with the straight long edge abutting a ground strip.

Arranged to slide on a base member, the block *L* has a projecting tongue *M* at one end, and this tongue is shaped on the leading corners to the same radius as the arcuate portion of the dog slip. When the block *L* is advanced towards the slip, the corners of the tongue *M* move the workpiece transversely, to align the arcuate portion. The right-hand end face of the dog slip makes contact with the plunger of the dial indicator, and if the reading obtained is within prescribed limits, the dog slip is accepted.

The slips are made from rectangular-section bar stock and the first operation provides for cutting blanks, with the end faces at the required angles, on a horizontal band saw. A simple work-holding fixture on the saw aligns the bar stock at the required angle, and the first cut separates a parallelogram-shaped piece which represents two slips, reversed and joined end to end. This

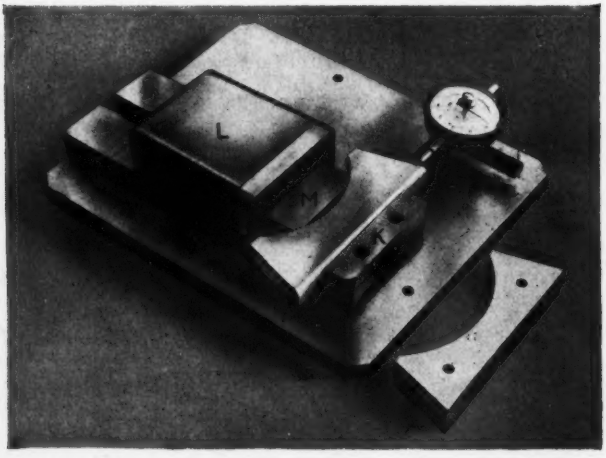



**Fig. 8. Simple fixture for checking the position of the arcuate portion on a rolling dog slip**

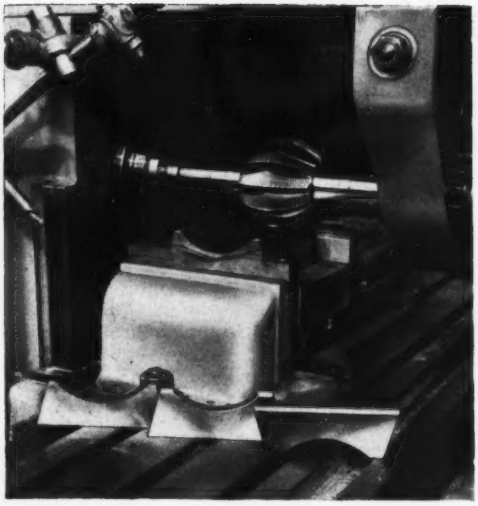


**Fig. 9. Serrations are milled in rolling dog slips with this special form cutter on a Cincinnati machine**

piece is then reversed and re-loaded into the fixture, and the second cut halves it and produces two rhomboids of the required size.

Operation (2) provides for machining the radius along the long straight edge, and at operation (3) the arcuate portion is plain-milled. Both these operations are carried out by conventional methods. For milling the serrations, the set-up shown in Fig. 9 is employed, in conjunction with the special form cutter. In the foreground may be seen (right and centre) views of two slips before, and (left) a slip after serration milling has been performed.

Slips of this size are milled, 12 at a time, at the set-up shown, on a Cincinnati No. 3P dial-type horizontal machine, and are gripped in a machine vice which has a ground step whereby the stack is located transversely. The solid form cutter has 16 banks of teeth, with 38 teeth in each bank, and the major diameter is 4 in. One pass suffices to cut all the serrations to the full depth, and the spindle speed and feed rate employed are 35 r.p.m. and 1⅞ in. per min.

After the completion of this operation, each slip has serrations extending across the full thickness of the material, and at the fourth and final stage cuts are taken in a direction normal to the serrations, around the arcuate shape. The set-up employed, on a Cincinnati vertical dial-type machine, is shown in Fig. 10, with a finished workpiece in the foreground. The special cutter seen in this illustration comprises five separate and identical portions, and each portion serves to machine away the serrations on one side of the dog slip (uppermost in the figure) to form a 45-deg. chamfer, to machine a shallow step on the other side, and to machine another groove, normal to the serrations, which divides the remaining length and produces a series of pyramid-shaped projections.

A stack of four slips is loaded into a simple fixture which is mounted on a power-driven rotary table, off-set from the centre by an amount equal to the radius of the arcuate portion. The centre of the table is, of course, off-set from the cutter spindle by the amount necessary to give the required depth of cut. The slips are made from mild steel, and are finally carbo-nitrided, in the company's plant.

## INSPECTION AND MEASURING EQUIPMENT

Various items of measuring and inspection equipment provided have been built to the company's specifications and designs, including the thread-

**Fig. 10. At this set-up, a second milling operation on the dog slips is carried out with a rotary table and a 5-bank form cutter**

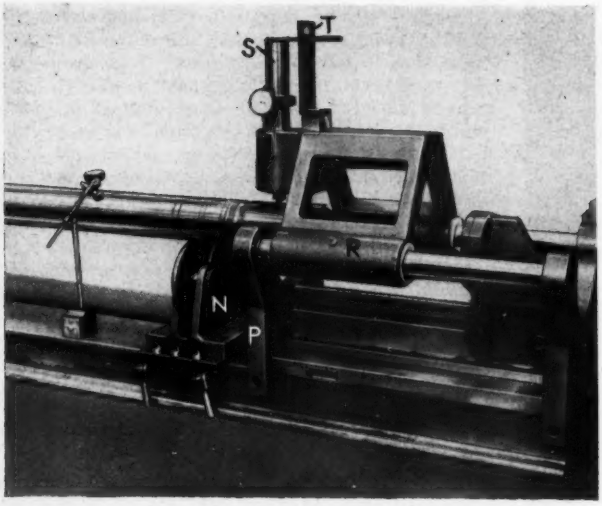



**Fig. 11. This equipment was designed by the company for carrying out concentricity tests on piston rods**

concentricity checking machine shown in Fig. 11. Mention has already been made of piston rods with A.P.I. threaded ends, and an example is seen in position for inspection. The equipment incorporates a long cast-iron bed with two rolling-disc type steadies, one of which is seen at *N*. Secured to the right-hand end of the bed there are two Y-shaped brackets, as at *P*, which serve to support a pair of accurately-ground cylindrical bars. These bars are set parallel, within very close limits, and act as guides for a cast carriage member *R*. The latter is required to slide freely on the bars, with the minimum of friction, and is fitted with ball-bushes which are enclosed at each end by P.T.F.E. seals.

At the left-hand end of the carriage *R* there is a large boss with a vertical bore, within which the quill *S* is a free sliding fit. Attached to the lower end of this quill is a steel probe, with a nose portion which is shaped to suit the form of the thread to be checked. This probe can readily be interchanged with others, to suit different threads, and a selection of probes may be seen standing on a ledge at the front of the steady *N*.

Before the piston rod is loaded, the carriage *R* is moved to the extreme right-hand end of the guide bars, and the quill *S* is raised to its full extent and retained in this position by the lifting handle which engages with a slot in the guide plate *T*. With the rod in place, the carriage is moved to the position shown, and the quill *S* is lowered to bring the probe into engagement with the threaded portion of the piston rod. Clamped to the upper portion of the quill there is a dial indicator, the plunger of which makes contact with a block projecting from the side of the boss on the carriage *R*. When the piston rod is rotated, by hand, the quill S will rise and fall in response to any eccentricity of the thread, and the extent of this movement is read directly on the dial indicator. During this operation, the carriage *R* is automatically moved to the right, since the probe acts as a nut which is in engagement with the thread.

When the probe reaches the tapered portion of the thread, which is at the extreme end and forms a continuation of the parallel portion, the concentricity is checked by observing the indicator needle, which should turn at a uniform rate. Any eccentricity is revealed by regular

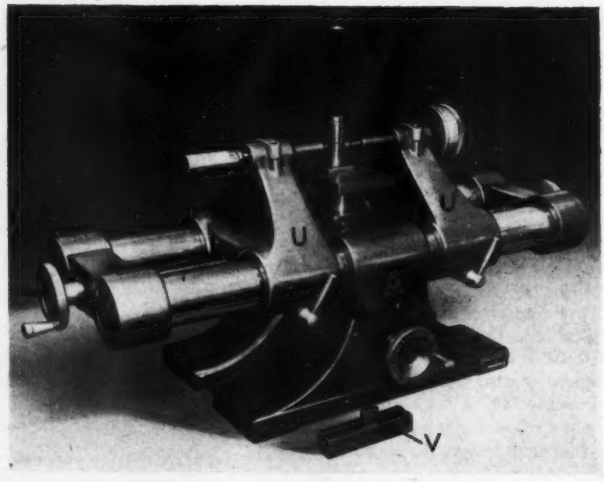



**Fig. 12. Designed by the company, this measuring machine is used for checking workshop gauges and is installed in the standards room at the Castlereagh works**

accelerations and decelerations of the needle. The equipment seen in Fig. 11 was built to the company's specification by the Belfast Tool & Gauge Co., Ltd., as was the measuring machine shown in Fig. 12. This unit is installed in the company's standards room and is used mainly for checking various plain and tapered plug gauges.

The two carriages *U* can be moved towards and away from each other on a pair of ground cylindrical guides by the action of a left- and right-hand screw, which is turned by means of the small handwheel seen at the left. Housed in the left-hand carriage there is a Matrix (Coventry Gauge & Tool Co., Ltd.) fiducial indicator, which serves as one anvil, and in the right-hand carriage, a large-diameter drum-type micrometer. A rectangular platform, between the two carriages, can be raised and lowered by means of the handwheel at the front of the equipment. This platform can be set for height (when it is required to measure the diameter of a taper at a certain point along its length, for example) by means of conventional slip gauges.

Next, the bridge piece *V* is placed on the platform, where it is located longitudinally by shoulders on the under-side. In the upper surface of the bridge piece *V* there is a groove in which is inserted a gauge block of a thickness equal to the nominal size of the part to be measured. The carriages are now moved towards each other and the fiiducial indicator and the micrometer are set to zero with reference to the gauge block. Finally, the bridge piece and gauge are removed, and the workpiece is substituted. Any error is indicated by the amount by which the micrometer requires to be adjusted to reproduce the zero setting obtained with the gauge block.

The other end of the piston rod seen in Fig. 11 has a tapered portion which fits in the bore of the piston, and the latter is checked for concentricity of the periphery in relation to the bore by means of the fixture in Fig. 13. A tapered mandrel *W* is inserted in the piston and the complete assembly is then loaded between centres on the fixture. Projecting from the base of the fixture, at the rear in the figure, there is a vertical post on which an arm *X* is pivotally mounted, so that it can be swung towards and away from the workpiece. This arm carries a round-ended probe *Y*, which makes contact with the lower reduced-diameter portion of the piston, and above it there is a dial indicator which makes contact with the upper reduced-diameter portion. A second dial indicator, at the left, is supported from the main column of the fixture, and is set so that the plunger engages with the major diameter portion of the piston.

When the mandrel is turned by hand, the left-hand indicator will register any eccentricity between the major portion of the piston and the taper bore, and the right-hand indicator, any eccentricity between the upper and lower reduced-diameter portions. The arm *X* is loaded towards the piston by the tension spring *Z*, to ensure that the probe *Y* is maintained in contact with the surface. When the arm is swung clear, for loading a fresh piston, the spring *Z* passes over the "top-dead-centre" position, and serves to retain the disengaged setting.

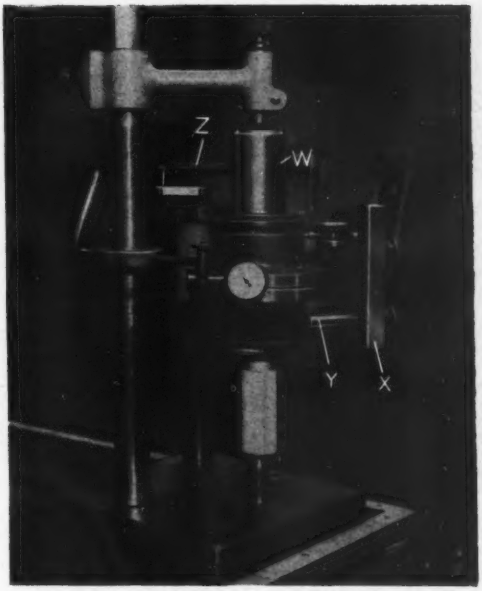



**Fig. 13. For checking the concentricity of various outside surfaces of pistons in relation to each other, and to the tapered bore, this special fixture is employed**

### AIR-OPERATED ASSEMBLY AID

A complete piston assembly comprises the steel head portion seen in Fig. 13, two heavy-section rubber seals (supplied by North British Rubber Co., Ltd.), two dished steel retaining plates, and two powerful round wire circlips. The seals are pressed into position by hand, as are the retaining plates, but the circlips are assembled with the aid of the equipment seen in Fig. 14. For the purpose of illustration, the guards have been removed from this equipment, and a typical fully-assembled piston is seen standing on edge at the right, where one end plate and the associated circlip can be clearly seen.

**Fig. 14. This set-up on an E.M.B. air-operated press (guards removed) provides for assembling powerful retaining circlips to pistons**

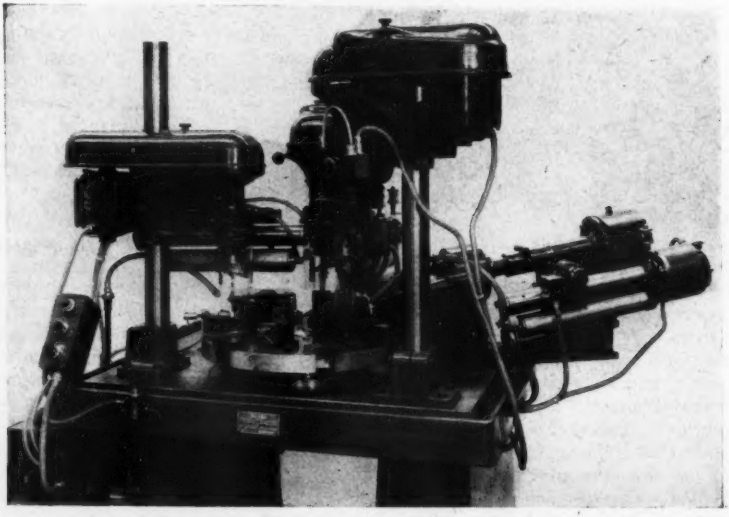
Supplied by E.M.B. Co., Ltd., West Bromwich, the press has been fitted with a special expanding-finger type tool, the fingers being retained in the contracted position by means of a round wire circlip. In operation, a piston head, complete with rubber seals, is placed in position on the platen, as shown, and one dished retaining plate is dropped over the boss portion and allowed to rest on the seal. Next, the tapered bung *A* is placed in position, centrally with the boss, and a circlip is slipped over it, as shown.

When the press is operated, the ram descends and a pilot pin within the claws enters the bung *A* and ensures that it is positively located. The continued movement of the ram causes the ends of the fingers to push the circlip down the outside surface of the bung, as a result of which it is expanded. In the final stages of the movement, the circlip is pushed off the lower end of the bung, over the boss on the piston, and into a groove in which it contracts. On the upward movement of the ram, the fingers slide up the periphery of the bung, and are returned to the contracted position by the associated circlip. To fit the plate and circlip for the other seal, the piston is inverted.

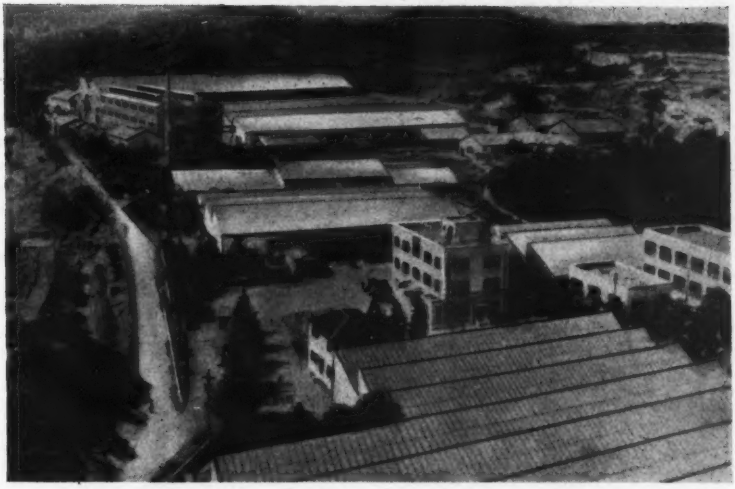
## Special Machine for a Motor Car Steering Gear Component

The special-purpose machine shown in the figure has recently been supplied by W. J. Meddings, Ltd., Ipswich Road, Trading Estate, Slough, Bucks., for operations on a motor car steering gear component. Arranged for manual indexing, the rotary table, which has six stations, is finally located and locked by a wedge operated by a double-acting air cylinder. Loading is carried out during the machining cycle, and at the various working stations, a 0·399-in. diameter hole is drilled and then spot-faced 0·75-in. diameter, and two 0·27-in. holes are drilled, and tapped ⅜-in. 24 UNF. The floor-to-floor time is approximately 12 sec.

Standard drilling machine parts and standard air-hydraulic feed units are employed, and tapping is carried out with a pitch-controlled head.



**Meddings special machine for operations on a steering gear component**



# Japanese Machine Tool Factories—8*

## Nippei Industrial Co., Ltd., Yokohama

By R. E. GREEN, Associate Editor

THE HEAD OFFICE and main plant of the Nippei Industrial Co., Ltd., are at 120, Horiguchi, Kanazawa-ku, Yokohama, and there are branches in Tokyo, Osaka, and Nagoya. This company is relatively newly established, having been founded in 1938 to carry on the business of designing machine tools and industrial equipment, making jigs and tools, and producing motor vehicle components. At present, the issued capital is £250,000, and the products include a range of centreless and cylindrical grinders, also a variety of other types of machines.

In 1936, the Uraga Dock Co., one of the leading ship-building companies in Japan, was requested by the Japanese naval authorities to start the manufacture of 20-mm. cannon shells in Japan. This company concluded a licensing agreement with the Swiss Oerlikon organization for the production of their machine guns and cartridges and for the sales rights in Japan and Manchuria. In the following year, the Uraga company established the Tomioka Munition Works, on the site now occupied by the Nippei company, and 18 Swiss engineers from the Oerlikon factory came for a period of two years to train Japanese in their production methods.

The Tomioka Munition Works became independent of the Uraga Dock Co. in 1938, and the name was changed to the Japan Ordnance Co. Ltd. As the activities of this company expanded, the need was felt for specialized machine tools which had to be imported from abroad, and in 1939 the Shonan machine tool factory was built on a nearby site, for designing and building these machines. Arrangements were made for another technical assistance group from the Swiss Oerlikon

* Articles on the Japanese metal-working industries which have already been published in MACHINERY have been concerned with the 4th Osaka International Trade Fair, 96/1212—1/6/60 and 96/1288—8/6/60; Motor Car Production in Japan, 96/1426—15/6/60, 96/1552—22/6/60 and 96/1640—29/6/60; Bicycle Production in Japan, 97/46—6/7/60; Refrigerator Production in Japan, 97/416—24/8/60, 98/176—25/1/61, and 98/640—22/3/61; Electric Motor Production in Japan, 97/708—28/9/60, 97/1276—7/12/60 and 97/1448—28/12/60; Television Receiver Production in Japan, 97/932—26/10/60; Transistor Production in Japan, 98/253—1/2/61; Sewing Machine Production in Japan, 98/468—1/3/61; and 98/828—19/4/61.

The Machine Tool Industry of Japan, 97/108—13/7/60; Japanese Machine Tool Factories, 1. Ikegai Iron Works, Ltd., 97/304—10/8/60, 2. Okuma Machinery Works, Ltd., 97/472—31/8/60, 3. Toyoda Machine Works, Ltd., 97/652—21/9/60, 4. The Kawasaki Works of Hitachi, Ltd., 97/1048—9/11/60, 5. Mitsui Precision Machinery & Engineering Co., Ltd., 98/408—22/2/61, 6. Hitachi Machinery Co., Ltd., 98/608—15/3/61, 7. Shibaura Machine Co., Ltd., 98/769—5/4/61.

**Fig. 1. Among the ten planing machines in the works of Nippei Industrial Co., Ltd., at Yokohama is this Takahasi machine, with a table length of 24 ft., here seen set up for an operation on the table ways on the bed of a cylindrical-type grinding machine**

Co. to visit the factory, and six engineers came and stayed for a period of about two years, to supervise the installation of plant, and to train sufficient workers in the methods of machine tool building to enable the company to build machine tools of a high standard of precision and efficiency.

During the war, the company made grinding, milling and drilling machines, in addition to 20-mm. cannon and shells. Some 70 per cent of grinding machines employed in the Japanese aircraft industry during the war came from this factory. After the war, when the present title was adopted, six other factories in various parts of Japan were closed, and activities were concentrated on the production of machine tools in the Yokohama plant. The production of munitions had been carried on in a series of widely-scattered buildings on high land behind the main factory, and in other buildings which still remained after the war, although they were unused. With the outbreak of the Korean war, the company was requested by the U.S. Government to produce shells, rocket launchers, machine gun mounts, flares and mines. These activities soon ceased, however, and the buildings were then devoted to the production of jigs, tools, and vehicle parts.

### THE NIPPEI MACHINE TOOL FACTORY

The Nippei factory buildings occupy a site of some 80 acres in a hilly district just outside Yokohama, and have a floor area of more than 700,000 sq. ft., although something like half the total is accounted for by small huts which were used for cartridge filling operations, and which are widely dispersed. The larger buildings are adjacent to the main railway line from Tokyo to Osaka, and are shown in the heading illustration, where the machine tool factory is seen in the background. Other activities including jig and tool making, and the manufacture of vehicle parts, are carried on in the buildings in the foreground. Most of the buildings are of corrugated asbestos and steel construction, although reinforced concrete has been also used for some of the smaller structures and office blocks.

Some 820 people are employed at present, of whom administrative and clerical staff number 80 and engineers of various levels, about 180. The remaining 560 include skilled machine operators, fitters, erectors, tool-makers, and other shop floor workers. In the works there are some 430 machine tools, of which about 57 per cent are Japanese-built, including more than 100 lathes, and between 30 and 40 each of drilling, milling, and grinding machines. These main groups are supplemented by presses, electric welding equipment, heat treatment plant, and special-purpose machines.

Among the ten planers, which are mainly employed for operations on machine tool components, is the Japanese-built Takahasi machine shown in Fig. 1. This machine has a table length of 24 ft., and is seen set up for operations on the table ways of a bed casting for a type CGA cylindrical grinder, from the range built by the company. The planer has swivelling tool-slides on the cross-rail and on the nearer column, but is not of modern design. There are two other Japanese-built planers, and seven imported machines, some of which were supplied by Gray (Gaston E. Marbaix, Ltd.). Of

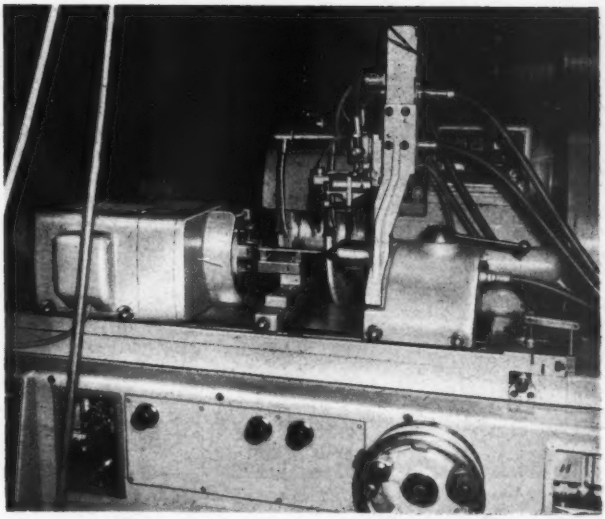


**Fig. 2. Close-up view of a special version of the plain cylindrical grinding machine made by the Nippei company, arranged for semi-automatic operation on portions at opposite ends of a small motor shaft**

the 12 horizontal boring machines, ten are of Japanese origin, and one of the two imported machines is a V.W.F. (Sykes Machine Tool Co., Ltd.), with a spindle diameter of 5 in.

Gears are cut on Maag (Burton, Griffiths & Co., Ltd.), Gleason (Buck & Hickman, Ltd.), and Fellows (Alfred Herbert, Ltd.) machines, and for finishing the teeth of hardened gears there are Maag grinders. Mention may also be made of three Société Genevoise jig borers, of which the largest is a No. 5 size.

### NIPPEI MACHINE TOOLS

The standard machine tools built by the Nippei company include plain cylindrical and universal grinders, for which common table traverse and wheel-head feed mechanisms are employed. Machines of the plain cylindrical type are built in sizes to swing 250 mm. (9·84 in.) and 600 mm. (23·6 in.) diameter over the table, and to accept work up to 500 mm. (19·68 in.) and 2,500 mm. (8 ft. 2 in.) long, between centres. There is one size of universal machine, which swings 250 mm. (9·84 in.) and admits 750 mm. (29·5 in.) between centres.

A close-up view of a special version of the smaller plain cylindrical machine, fitted with an extended spindle to take two grinding wheels for operations on portions at opposite ends of a motor shaft, is seen in Fig. 2. The machine is arranged for semi-automatic operation, and the table carries a loading fixture with two V-blocks, in which the shaft is placed. When the cycle is started, the tailstock quill is advanced hydraulically to engage the right-hand centre hole of the shaft, and to push the left-hand end into the jaws of a hydraulically-operated chuck on the work spindle.

This chuck has a male centre which

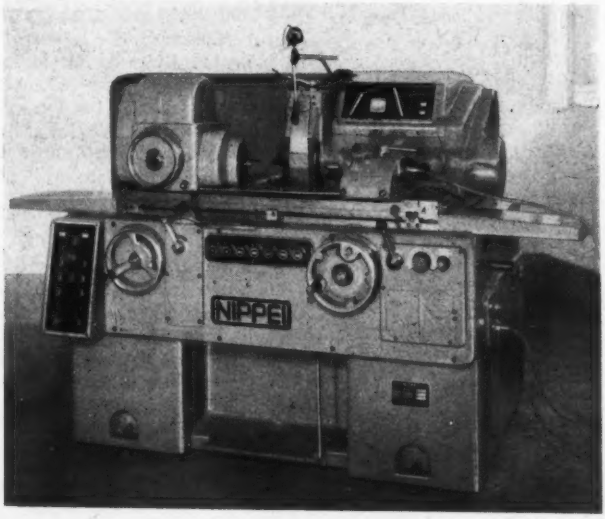



**Fig. 3. The CGE 10/30 plain cylindrical grinding machine is fitted with equipment for automatic control of the grinding cycle, incorporating a caliper-type gauging unit supplied by the German firm of Carl Mahr**

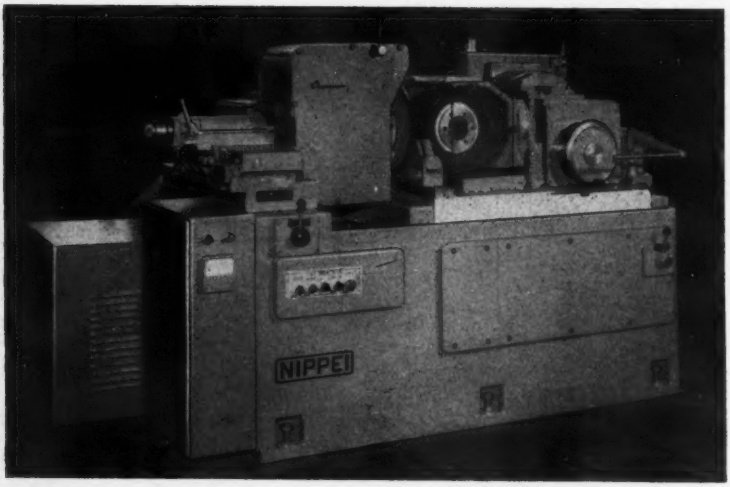



**Fig. 4. The latest type of centreless grinder in the Nippei range is this CLG 2E machine, with a capacity for grinding work up to 3·5 in. diameter by either the through-feed or plunge method**

engages the centre hole in the shaft so that the latter is raised clear of the V-blocks, and the jaws have plain gripping surfaces. The automatic cycle provides for rapid approach of the wheel, rough and finish grinding, and sparking out, followed by rapid retraction of the wheel-head and release of the workpiece, which is left resting in the V-blocks. The two portions ground are of 8 and 20 mm. diameter (0·315 and 0·7874 in.), and they are held to limits of ±0·01 mm. (±0·0004 in.) About 0·2 mm. (0·0079 in.) on diameter is removed, and the cycle time is 20 sec.

The stages in the grinding cycle, including roughing and finishing, and sparking out, are controlled by the caliper-type gauge seen mounted on the tailstock, which is applied automatically to the 8-mm. diameter portion, by a hydraulically-operated mechanism. This unit was made by the Tokyo Precision Instrument Co., Ltd., 31 4-chome, Higashi-Kamata, Ota-ku, Tokyo, and is connected to a coloured light panel on the wheel-head. Lamps are illuminated on this panel to indicate that various stages in the grinding cycle are completed. It may be noted that cycle-control equipment supplied by the German firm of Carl Mahr (Lerche Machine Tools, Ltd.) is fitted to many Nippei cylindrical grinding machines.

### TYPE CGE 10/30 CYLINDRICAL GRINDER

The latest type of cylindrical grinding machine, shown at last year's Osaka International Trade Fair, is the CGE 10/30, seen in Fig. 3, which has a capacity for work up to 100 mm. (3·94 in.) diameter by 300 mm. (11·8 in.) long. The hydraulically-operated table can be traversed at speeds from 1·18 in. to 13 ft. per min., and the work-spindle speed is steplessly-variable between 40 and 750 r.p.m. Drive to the 16-in. diameter wheel, normally fitted, is taken from a 5 h.p. motor. Mahr gauging equipment, as mentioned above, is mounted on the grinding wheel guard, and—in conjunction with the cycle control equipment—enables tolerances as close as 0·002 mm. (0·00008 in.) to be held.

Traverse- or plunge-cut grinding, or wheel-dressing, can be selected by turning a knob, and the operating cycle is then started by means of an adjacent lever. In traverse grinding, feed increments, ranging from 0·002 to 0·05 mm. (0·00008 to 0·002 in.), may be applied at one or both ends of the table stroke. Feeds for plunge grinding can be varied steplessly from 0 to 5 mm. (0 to 0·2 in.) per min. A grinding cycle similar to that of the machine previously described can be obtained, and the stages are indicated by coloured lamps behind a panel on the wheel-head of the machine, in which there is a transparent slot in the form of a graph. Separate coloured lamps are also illuminated to mark the completion of each stage in the operating cycle of the machine.

### CENTRELESS GRINDING MACHINES

Nippei centreless grinding machines are made in two sizes—No. 2 and 3—with capacities for work up to 90 and 150 mm. (3·54 and 5·9 in.) diameter, and in different types in each size. The type CLG 2E, shown in Fig. 4, is representative of the smaller range, and has a wheel-head, at the left, which is secured to the base and carries a wheel of 20 in. diameter by 8 in. wide, driven at 1,100 r.p.m. by a 15-h.p. motor. Of 12 in. diameter, the regulating wheel is driven by a 2-h.p. motor at steplessly-variable speeds from 10 to 100

r.p.m., the speed in use being indicated by a tachometer. Pre-loaded roller guides are provided for the regulating wheel slide to enable fine feed increments to be applied, and the regulating wheel can be set with its axis at an angle up to 8 deg. to that of the grinding wheel, on either side of the parallel position.

Wheel-truing is performed by hydraulically-operated diamond-dressing units, the unit for the grinding wheel being seen at the left in Fig. 4. The dressing unit for the regulating wheel is mounted above the wheel-head, so that it is swivelled to the same angle as the wheel and does not require separate adjustment. A simpler machine, designated 2B, is available, and the type 2E illustrated, which is arranged for manually-controlled through-feed or plunge grinding, can also be supplied in modified form for automatic through- or plunge-feed operations.

Other refinements which can be provided include an automatic size-control unit for through-feed grinding, with a measuring head which comes into operation at adjustable intervals. On the machine thus equipped, which is known as the type 2F, a timer is fitted to stop the cycle-repeat mechanism after a pre-set interval, and bring the wheel-dressing unit into operation. Automatic movement of the regulating wheel slide towards the work-rest follows, to compensate for the material removed from the grinding wheel, and the automatic cycle is then re-started.

Another variation is the 2G machine, one of which is seen in course of construction in Fig. 5. Designed for grinding the arms of universal joint spiders, this machine is so equipped that the spiders are automatically loaded, ground, and unloaded at the rate of 12 pieces per min.

Spiders are loaded manually into a sloping magazine, seen at A, and are carried down to the grinding position by a pneumatically-operated vertical slide, to rest on a slotted work support. With the spider in the grinding position, the cycle is started automatically, and provides for rapid advance of the regulating wheel, rough and fine grinding stages, a dwell for sparking-out, and rapid withdrawal of the regulating wheel slide. These stages are governed by a unit similar to that employed on the cylindrical grinding machine in Fig. 3, and the graph-type indicating unit, showing the progress of the cycle, is seen at the left in Fig. 5.

Finished spiders are raised from the work-rest at the end of the cycle, by the vertical loading slide, to a position level with the lower end of the chute A. Here, they are released into an extension of the chute on the near side of the loading unit, and move down into a gauging station on top of the wheel-head cover, where the finished diameters are automatically checked. When the measured diameter differs from the pre-set size by more than 0·004 mm. (0·00016 in.), a solenoid valve is operated. This valve controls a cylinder which turns a wheel in a gear train coupled to the feed screw for the regulating wheel slide, with the result that a feed increment of 0·002 mm. (0·00008 in.) is applied to the regulating wheel.

Equipment is also provided, whereby the grind-

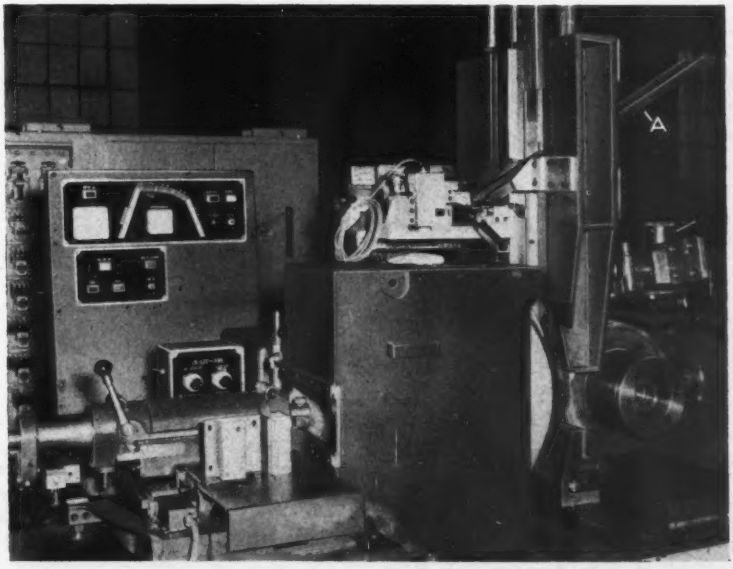



**Fig. 5. Recently-completed centreless grinders have included this type CLG 2F machine for universal joint spider arms, which is arranged for automatic loading, grinding, unloading and gauging with feed-back control of work diameter**

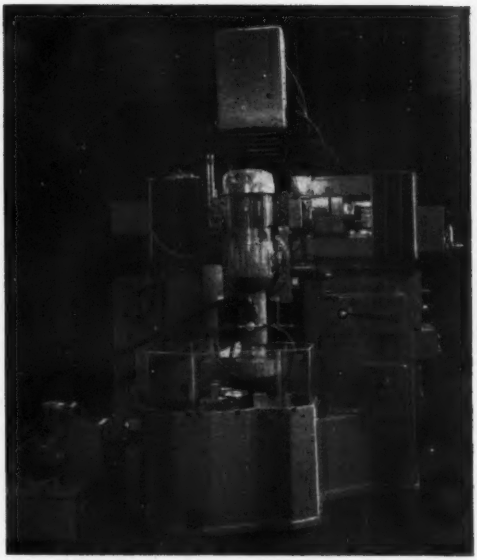


**Fig. 6. This machine, which resembles a vertical boring mill, provided with a grinding spindle instead of a tool slide, can be used for internal, external or surface grinding**

ing wheel is automatically dressed, and compensating feed is applied to the regulating wheel, after a pre-set number of pieces has been ground. Apart from their larger capacity, the No. 3 size centreless grinding machines resemble the smaller units here described.

### UNIVERSAL VERTICAL GRINDING MACHINE

A machine of somewhat unusual design, for internal or external grinding operations, is the universal, vertical, type 50/10, shown in Fig. 6, which resembles a vertical boring machine. Workpieces up to 100 mm. (3·94 in.) long, can be ground, with maximum external and internal diameters of 500 and 250 mm. (19·68 and 9·84 in.). The grinding wheel, normally of 180 mm. (7 in.) diameter, is mounted on an extension of the 5-h.p. motor spindle and is driven directly at a speed of 3,500 r.p.m. Surface grinding can also be performed on the machine, and for this purpose a cup-shaped wheel is fitted to the spindle. The wheel-head is carried on a slide which can be adjusted vertically over a distance of 200 mm. (7·87 in.), but, as indicated above, automatic vertical reciprocation is restricted to a stroke of 100 mm.

The wheel-head slide is carried on a saddle on the horizontal cross-rail, and can be swivelled to an angle up to 45 deg. on either side of the vertical position, for grinding tapers. Maximum traverse of the saddle is 600 mm. (23·6 in.), and there is provision for oscillating the grinding head through a stroke of 50 mm. (1·96 in.) during surface grinding operations. Hydraulic traverse rates for surface grinding can be varied from 3·94 to 39·4 in. per min., and for cylindrical work from 0·787 to 39·4 in. per min. Feed increments of 0·0004 in. can be applied automatically during cylindrical grinding, and manual feeds for surface grinding are obtained from a handwheel graduated in 0·0002-in. divisions.

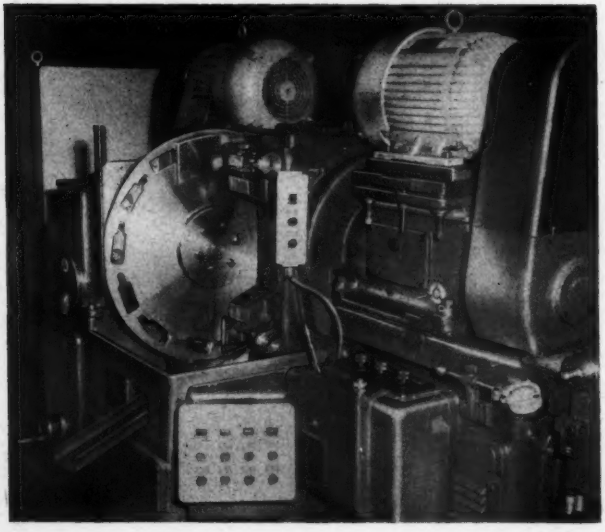


**Fig. 7. The almost completed, double-disc, face-grinding machine, here shown in the unpainted condition during testing, has been built for operations on miniature connecting rods, which are ground on both sides at the rate of 6 per min.**

Workpieces are held in a 3-jaw chuck of 19·68 in. diameter, mounted at the top of a vertical spindle in the machine base, and driven at steplessly-variable speeds from 3·5 to 14 r.p.m.

#### DOUBLE-DISC FACE-GRINDING MACHINES

Another type of machine in the company's range is the double-disc grinder, shown in course of construction in Fig. 7, for operating simultaneously on opposite faces of components. Two sizes of these machines are made, to grind components of 0·39 to 1·96, or 0·79 to 5·9 in. diameter, by 0·39 to 1·96 in. thick. Grinding wheels of 23 in. diameter are driven by 15-h.p. motors at 910 r.p.m. Workpieces are carried between the wheels in shaped apertures in steel discs of 5·12 and 27·56 in. diameter, which are driven at speeds from 1·4 to 2·8, and 7·5 to 22·5 r.p.m., on the small and large machines respectively.

The machine shown in Fig. 7 is provided with a steel work-carrier disc for continuous grinding of miniature connecting rods, which are completed at the rate of six per min. The rods are placed manually in the shaped slots in the disc and are pressed against a magnetized plate which extends over part of the disc face on the far side. After passing between the grinding wheels, the rods are automatically discharged by a kicker mechanism at the lowest position, and pass down a roller track to the chute shown. Another machine recently completed—as part of the order for which the machine in Fig. 5 was built—was for grinding the end faces of the arms on universal joint spiders, at the rate of eight pieces per min.

Further articles concerned with machine tool factories in Japan, and with other Japanese metal-working plants, will be published in forthcoming issues of MACHINERY.

© The Machinery Publishing Co., Ltd., 1961.

# Construction Work on a Large Walking Dragline

The rotate-frame of a Ransomes & Rapier type W.1350 walking dragline is here shown in course of construction at the Waterside Works of Ransomes & Rapier, Ltd., Ipswich. This type of machine, when fully built and equipped, weighs 1,400 tons, and is normally employed for stripping overburden in connection with coal and ironstone working. The bucket has a capacity of 33 cu. yd. which is the equivalent of 50 tons of material, and this weight is carried by the jib at a radius of 215 ft. Power for the 14 main motors, 8 of which are of 300 h.p. and 6 of 225 h.p., is provided by two 1,500 h.p. motor-generator sets which draw current from a trailing cable connected to a 6,600-volt a.c. supply.

The metal strips seen in the shop floor are spaced at regular intervals on a datum level and serve as references from which measurements may be taken when assembling structures for these large machines. The two transportable radial drilling machines seen on the deck of the structure are lifted and positioned, as required, by a travelling crane.

**The rotate-frame for a large walking dragline is here seen under construction at the works of Ransomes & Rapier, Ltd.**

# East German Machine Tools at the Leipzig Fair

By R. E. GREEN, Associate Editor

Reference has been made to some new or improved machine tools, including lathes, vertical boring mills, and drilling, jig-boring, and grinding machines, exhibited by factories in the Eastern Zone of Germany at the recent Leipzig Spring Fair, in two articles in MACHINERY, 98/939—26/4/61 and 98/1006—3/5/61. Other examples of machine tools from the total of about 130 shown by the industry of East Germany are considered in this article.

## UNIVERSAL GRINDING MACHINE WITH AUTOMATIC CYCLE CONTROL

There is provision for automatic control of the cycle by means of a caliper measuring instrument on the type SU 125 by 400 universal cylindrical grinding machine shown in Fig. 1. Built by VEB Schleifmaschinenwerk, Karl-Marx-Stadt, W, 16, Zwickauer-Str., 137, the machine illustrated is the smallest of a range of sizes made in this factory. It can be supplied with two table lengths to admit 7·87 or 15·74 in. between centres, and swings 4·9 in. over the table. For external grinding, a wheel of 11·8 in. diameter and up to 1·25 in. wide is employed, which is driven by a motor of 3·3 h.p. Hydraulic rapid traverse through a distance of 1·25 in. is provided for the wheel-head, which has a swivel slide to enable tapers up to 35 deg. to be ground by the plunge method.

Hydraulically-operated, the table can be traversed at steplessly-variable speeds from 3·9 in. to 19·68 ft. per min., and it can also be oscillated to improve the surface finish obtained by plunge grinding. Swivel adjustment for the table, up to 15 deg. on each side of the zero position, is available for taper grinding. The work-spindle is driven by a motor of 0·75 h.p., through a steplessly-variable reduction unit at speeds from 200 to 1,000 r.p.m., speed changes being obtained by means of a knob at the front of the head. Behind this knob there is a chart showing the spindle speed selected. The work-head can be swivelled through 90 deg.

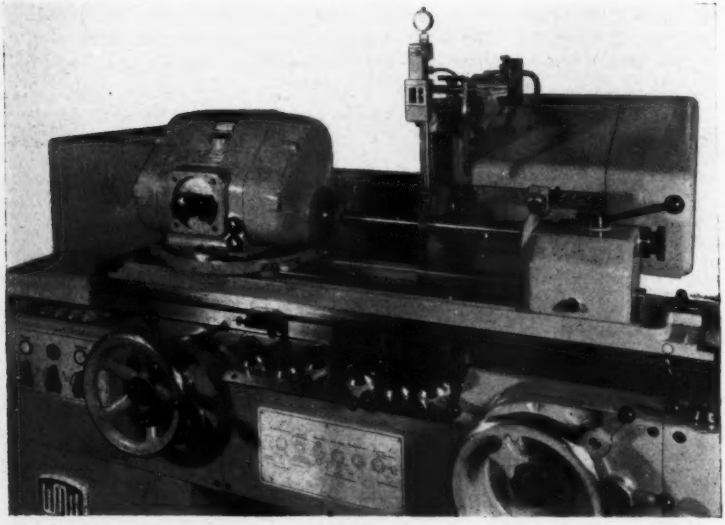


**Fig. 1. Automatic cycle control on this type SU 125 by 400 universal grinding machine is obtained by means of an electro-mechanical measuring instrument mounted on the wheel-housing, which moves down to engage the work when a hydraulic ram is retracted**

Automatic cycle control equipment of two forms is available, one of which is shown in Fig. 1, and for the alternative arrangement a somewhat similar instrument is mounted on the table. The instrument illustrated is of the caliper type, with a measuring range of 0·19 to 1.57 in., and is secured to a horizontal shaft carried in a bracket which forms part of an extension to the wheel spindle hous-

ing. This extension also accommodates a small single-acting hydraulic cylinder, the ram of which is round-nosed and projects towards the front of the machine. Attached to the shaft there is a short lever which projects downwards in front of the ram, and when the cylinder is connected to exhaust, the weight of the instrument is sufficient to turn the shaft and the lever, and the ram is pushed into the cylinder.

The speed at which the instrument is thus lowered is controlled by an adjustable flow valve, and it is brought into engagement with the work automatically, when a button is pressed at the beginning of the cycle. The caliper has a fixed and an adjustable pad, and a third contact is connected to the plunger of a new design of electro-mechanical gauging instrument, made by VEB Feinmesszeugfabrik Suhl, which is housed in the rectangular casing. Other applications of this instrument to the control of grinding machines, it may be recalled, were considered in the previous article in this series.

Electrical signals are produced by the instrument, in accordance with the diameter of the workpiece, and these signals serve to control the machine cycle by means of equipment built into the bed. This equipment provides for changing the feed of the wheel slide from rough- to finish-grinding rate, and for a fixed sparking-out period. During this cycle, lamps on a panel at the left-hand end of the bed are illuminated to indicate the various stages, and when the work reaches the required final size, the measuring caliper is automatically retracted by means of the small hydraulic cylinder. At the same time, the wheel-head is withdrawn, and the work-spindle drive motor is switched off automatically in readiness for unloading.

With the type of measuring unit shown, it is stated that diameters can be consistently ground to limits of ±0·00012 in. When closer limits must be held, the table-mounted unit mentioned earlier is employed, which, it is claimed, will control the diameter to ±0·00006 in.

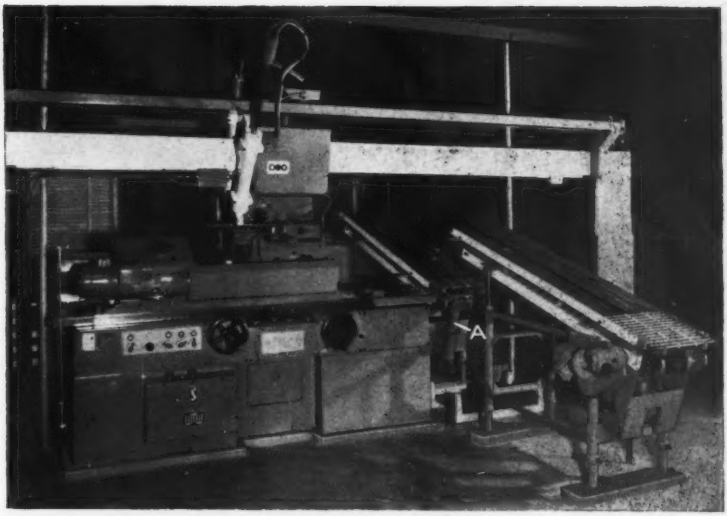


**Fig. 2. The automatic, air-operated loading and unloading equipment on this plain cylindrical grinder can be applied to a variety of different machines to be joined into automatic link-lines**

## PLAIN CYLINDRICAL GRINDER WITH AUTOMATIC LOADING

Another cylindrical grinding machine—the type SA 200 by 630—made by the same factory, was exhibited with automatic loading and unloading equipment, which enables it to be readily incorporated in a link-line of the type described in MACHINERY, 95/213—12/8/59, for operations on shaft components. A general view of the machine is given in Fig. 2, and it is made in both plain and universal types, with a swing capacity of 7·87 in., and with three bed lengths to admit work up to 17·7, 24·8, and 31·5 in. long between centres. The machine illustrated is the plain cylindrical type with the intermediate bed length.

Grinding wheels up to 15·75 in. diameter by 1·57 in. wide are normally employed, but the width can be increased to 3·15 in. for plunge-grinding, and gangs of wheels up to a total width of 3·9 in. can also be accommodated. The wheel spindle is driven by a motor of 4·7 h.p., at 1,400 r.p.m., through V-belts, and the head is moved on vee and flat ways by a screw, fitted with a hydraulically-operated anti-backlash mechanism. Wheel dressing, for plunge-grinding several diameters, is performed by a hydraulic unit mounted above the head, under the control of a template.

The speed of the hydraulically-powered table

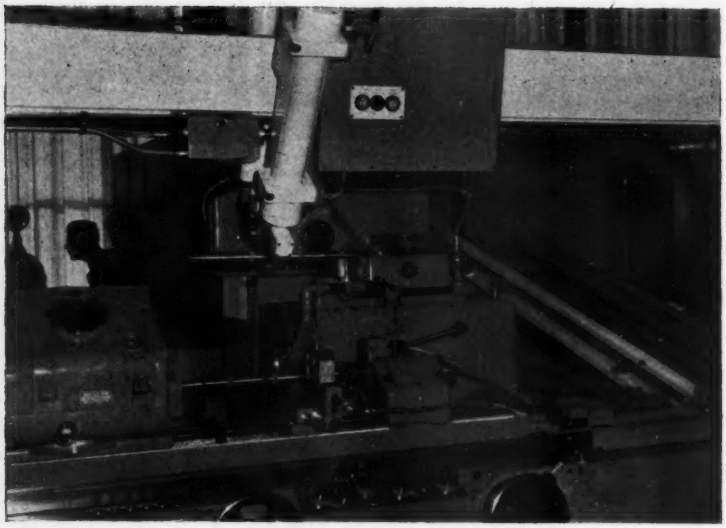


**Fig. 3. Control of the automatic cycle for plunge-grinding two diameters on an electric motor shaft on the machine in Fig. 2, is obtained from a table-mounted measuring instrument which is advanced hydraulically**

can be steplessly varied from 3·9 in. to 19·68 ft. per min., and an oscillating motion is available for plunge-grinding. Table reversal is accurate within 0·004 in. of the pre-set position at either end of the stroke, and there is provision for dwell periods up to 6 sec., if required. Drive to the work-spindle is taken from a 1-h.p., flange-mounted motor, through a steplessly-variable, V-belt unit. Speeds from 40 to 500 r.p.m. are thus obtainable, which are shown on a built-in revolution counter. The work-head may be swivelled through 90 deg. Hydraulic fluid is supplied by a triple, helical-gear pump, driven by a 2-h.p. motor in the bed.

## AUTOMATIC LOADING EQUIPMENT

In the example shown, the automatic loading equipment is inter-connected with the automatic cycle-control unit of the machine, which is generally similar to that provided on the machine previously described. The loading equipment, which is intended for application to a wide range of machine tools to enable them to be incorporated in automatic production lines, includes two similar conveyors for bringing the parts to, and carrying them away from the machine, and an overhead transporting unit for loading and unloading. Components—electric motor shafts in the set-up shown—would be placed on the far end of the rear conveyor by the unloading unit of the previous machine, and they roll down the inclined surface to stops at the lower end.

Here, the lowest shaft is held in position above two V-notched projections on a horizontal plate attached to the ram of the inclined air cylinder *A*, and when this cylinder is energized, the shaft is raised to a position in which its axis is aligned with that of the work-spindle of the machine. From this position, the shaft can be picked up by air-operated fingers on the end of the ram of an inclined air cylinder at the rear of the motor-driven carriage of the overhead transporting unit. There are two cylinders, which are so arranged that when the rams are fully extended the fingers occupy the same positions in space.

The motor-driven carriage is then actuated and it moves to the position shown in Fig. 2, at which it is stopped by a micro-switch. The front air cylinder ram is then lowered, and the fingers are closed on the previously-ground shaft which rests in two V-notched brackets on the machine table. This shaft is then raised, and the rear ram is extended to lower the fresh shaft into alignment with the work-spindle axis. When the fingers are opened, the shaft is deposited in the vees of the brackets mentioned, as seen in the close-up view in Fig. 3, and the ram is retracted.

The automatic cycle of the machine is then started, and the tailstock centre is advanced, to push the shaft to the left against the pressure of a spring driver, which engages the end face, on to the work-spindle centre. The machine is fitted with the table-type electro-mechanical grinding control instrument, mentioned previously, which is advanced into engagement with one of the two diameters to be ground on the shaft by a hydraulic cylinder. At the same time, the wheel-head is traversed rapidly forward to the grinding position, and the roughing stage is begun.

Changes to the finishing feed and sparking out are effected automatically, and the diameters are

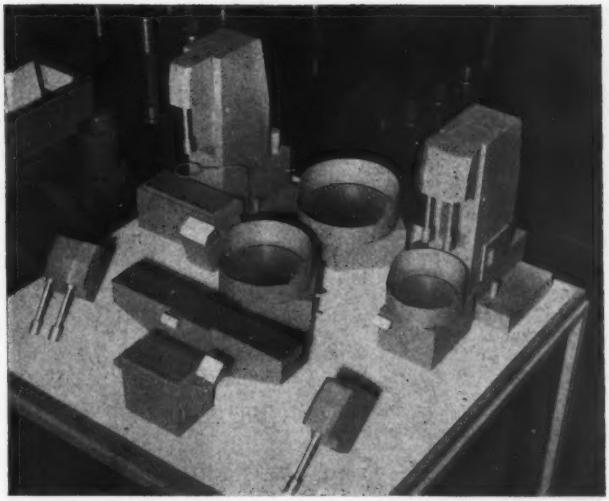


**Fig. 4. Standard and special-purpose honing machines can be built up from a series of units, models of which are shown here. Provision is made for machines with one or two spindles, and with rotary or in-line indexing tables**

ground to 1·1811 +0·00043 −0·00008 in., and 1·1024 +0·00059 −0·00008 in. During the grinding cycle, the transfer carriage is returned to the right-hand position, where the previously ground shaft is deposited on notched, pivoted levers, which are raised beneath the ends. These levers are subsequently lowered to release the shaft, which then rolls down the conveyor.

The automatic wheel dressing cycle, when selected, takes place during the loading sequence, and the wheels may be dressed after any number of cycles from one to ten. The path of the diamond is controlled by a stepped template, and the dressing time is some 15 sec. longer than the loading time, the machine cycle being automatically delayed. The total cycle time for grinding the two diameters is 1·1 min.

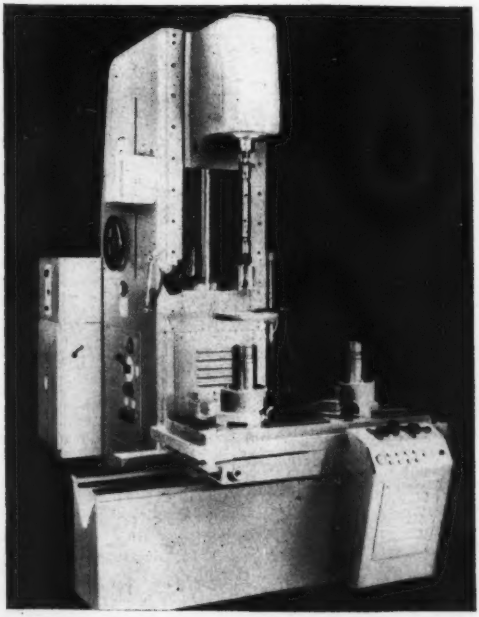


**Fig. 5. An example of a vertical honing machine built from a range of standardized units, models of which are shown in Fig. 4. This machine is equipped for operations on the bores of diesel engine cylinder liners**

### NAUMBURG HONING MACHINES

Among the exhibits of VEB Werkzeugmaschinenfabrik Naumburg, Rathenau-Str., 6-7, was a larger size of the double-wheel, flat lapping and honing machine described in MACHINERY, 95/113—22/7/59, with lapping discs of 31·5 in. diameter, instead of 15·75 in. This factory, also, has adopted unit construction for a range of vertical honing machines, and the variations obtainable were demonstrated with the aid of the group of models shown in Fig. 4. Standard units include columns and heads, for single- and twin-spindle machines, which can be arranged for operation in conjunction with stationary or movable table units, a bed with an indexing in-line transfer system, or one of three sizes of rotary indexing table.

An example of a vertical honing machine—type SZS 200 by 500E—constructed from these standard units, was also displayed, and is shown in Fig. 5. This machine has a capacity for honing bores from 0·98 to 7·87 in. diameter, and up to

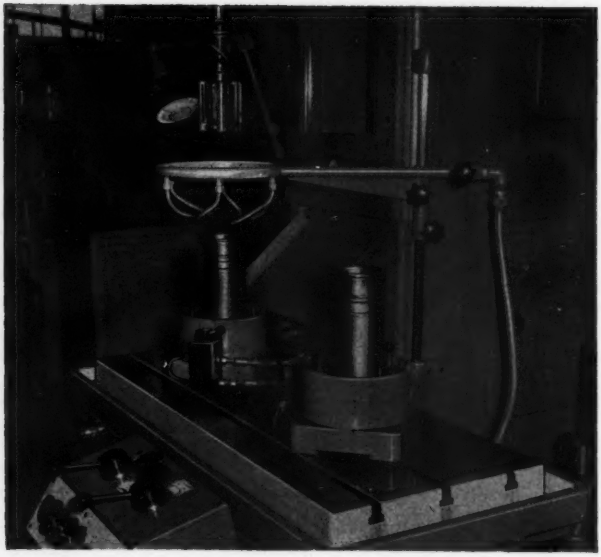


**Fig. 6. A close-up view showing the honing tool, which contains six diamond-impregnated copper sticks, and the clamping fixtures for the cylinder liners on the machine in Fig. 5. Clamping is effected hydraulically, after insertion of a bayonet-type clamp ring**

19·68 in. long. The honing spindle speed is steplessly variable between 36 and 315 r.p.m., and the speed of reciprocation of the head between 9·8 and 49 ft. per min. Height of work above the table is limited to 24·8 in.

The larger of the two currently available table-bed units is incorporated in this machine, and the table measures about 1·5 by 4 ft. For the diesel engine cylinder liners shown in position on the table, the fixtures are spaced at a distance corresponding to the stroke of the table (24·8 in.), which is powered by a hydraulic cylinder. Further details of the set-up may be seen in the close-up view of the table and honing tool in Fig. 6. The fixtures are of similar design, and each has a bore to receive the lower flange of the cylinder and provide rough location. After loading the cylinder, a clamping ring is placed over it, lowered into the fixture, and turned slightly to engage bayonet projections beneath an inward-facing flange.

Hydraulic pressure is then admitted to a short-stroke cylinder within the fixture, which raises the cylinder liner until the flange is pressed against the lower face of the clamping ring. The honing tool is provided with six diamond-impregnated copper sticks, which are expanded hydraulically, under the control of a Massi electro-pneumatic gauging unit. This unit, which is connected to carbide-faced pads on the tool, provides a continuous indication of the size of the bore, and stops the machine automatically when the required diameter has been reached. Before they come to this machine, the liners are bored to 110 mm. diameter over the length of 210 mm. (4·33 by 8·26 in.), and the honing operation removes 0·0015 to

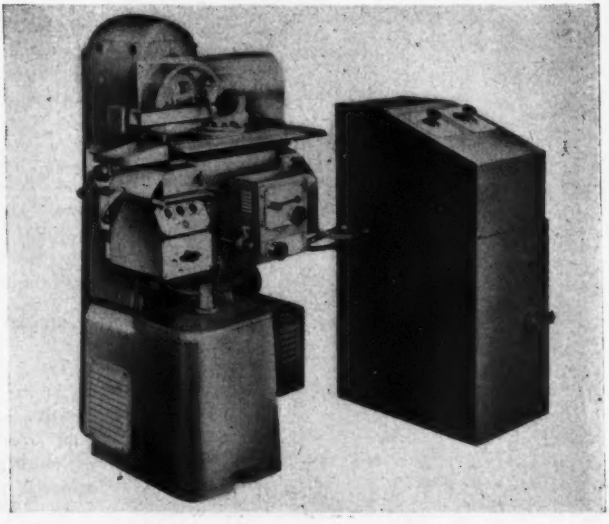


**Fig. 7. General view of the STAXG 125 by 500 cutting-off machine for semi-conductor materials. For this purpose, a small horizontal milling machine was modified and fitted with a high-speed spindle**

Fig. 8. On the cutting-off machine the spindle is fitted with an annular carrier for the disc, and cutting is performed by the edge of the bore. The steel disc is diamond-impregnated

0·0025 in. on the radius in a period of 1·5 to 2 min. Limits of ±0·00012 to 0·0002 in. are normally held on such bores, it is stated, with the automatic size control system employed.

### SPECIAL SLICING MACHINE FOR SEMI-CONDUCTOR MATERIALS

A special cutting-off or slicing machine, type STAXG 125 by 500, as shown in Fig. 7, was exhibited by VEB Werkzeugmaschinenfabrik Auerbach, Bertolt-Brecht-Str., 6. Developed from one of the range of small milling machines made in the factory, and incorporating standard units, it is intended for cutting-off wafers of hard or brittle materials, and especially of semi-conductors such as germanium and silicon. Slices are cut to a high degree of accuracy for thickness and parallelism, it is claimed, and with relatively small wastage of the expensive material.

The normal milling spindle of the machine has been replaced by a high-speed spindle which is driven at 5,600 r.p.m. by a motor of 1·3 h.p. On the end of this spindle is mounted a cup-shaped carrier for the cutting disc, which has a diameter of 7·8 in. and a bore of 3 in. This disc is of steel, with a thickness of 0·015 in., and the metal surrounding the bore is impregnated with diamond powder whereby the cutting operation is performed. The arrangement is shown in Fig. 8, and it will be seen that the cutting disc is surrounded by a housing, with a cover of transparent plastics material through which the operation can be observed.

This housing retains the coolant solution, which may be of salt in water, and this solution is pumped back to the cabinet at the right in Fig. 7, where filtering equipment is provided whereby the germanium or silicon particles are extracted for re-melting. Material to be sliced, in the form of an irregular bar, is fastened with adhesive to a plate, which is secured to a rod held in a bracket on the 20- by 5-in., T-slotted table. The bar projects

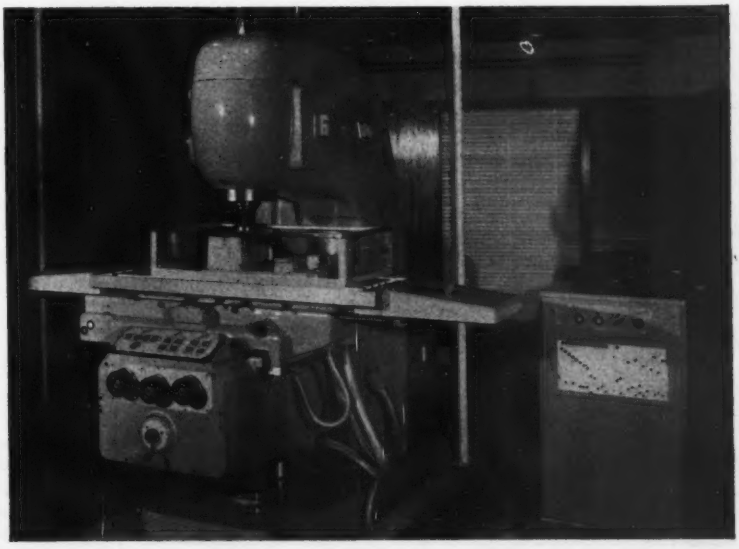


Fig. 9. Programme control of this FS 355 by 1,600/III vertical milling machine enables a total of 24 successive changes in the direction of feed to be obtained

**Fig. 10. Automatic feeding of stud blanks, to be threaded at opposite ends at the rate of 40 pieces per min., is provided on this GWR 80, cylindrical-die, thread-rolling machine, by a magnetic disc**

through an aperture in the plastics cover and through the hole in the disc, and the table is fed to the left, for the cutting operation, at a rate which is steplessly-variable from 0·078 to 6·3 in. per min.

Both the feed rate, and the amount of the automatic advance of the table after each cut, can be set by means of dials on the cabinet. Automatic controls are also provided for the supply of coolant through the three pipes at the top of the cutting disc housing and through a pipe connected to the fixture bracket. This latter pipe applies coolant to the face of the slice which is unsupported, at the outside of the cutting disc, to prevent it from being heated and distorted.

## VERTICAL MILLING MACHINE WITH PROGRAMME CONTROL

The type FS 355 by 1,600/III, vertical milling machine shown in Fig. 9, with programme control of table movements in three directions, was exhibited by VEB Fritz-Heckert-Werk, Karl-Marx-Stadt, 30, Jagdschänken-Str., 17. This machine has table dimensions of 14 by 63 in., and is intended for face-milling operations on light alloy components. Drive to the spindle is taken from a 13 h.p. motor, and there are 18 speeds ranging from 56 to 2,800 r.p.m. Longitudinal and transverse feeds range from 1·5 to 78 in. per min., and vertical feed rates from 0·5 to 26 in. per min.

With the equipment shown, a programme comprising a maximum of 24 movements of the table can be set up, with the aid of punched cards which serve to indicate those sockets in a panel in which selector plugs are to be inserted. Adjustable stops in T-slots at the front edge of the table, and on the saddle and knee, are set to operate limit switches at the completion of each traverse. When one of these switches is closed, the next movement in the series is automatically selected. Developments in the system will enable as many as 48 movements of the table, saddle, and knee to be programmed, if required, to cover an extensive range of automatic production cycles. At the

**Fig. 11. A view of the feed hopper fitted to the thread-rolling machine, showing the magnetic disc *B*, whereby the studs are picked up and fed into the chutes *C* and *D***

exhibition, the machine was programmed for milling bosses on an aluminium casting at five different levels, which involved the use of all the available movements of the equipment.

### AUTOMATIC THREAD-ROLLING MACHINE

The universal, cylindrical die, thread-rolling machine, exhibited by VEB Werkzeugmaschinenfabrik, Bäd Duben, Martin-Otto-Str., 1-3, and shown in Fig. 10, was arranged for automatically feeding stud blanks and threading them at opposite ends. Based on the standard type GWR 80, from the range made by the factory, the machine is of conventional construction with a fixed and a movable die. The moving die is hydraulically operated and will exert a maximum force of 12 tons, pressure fluid being supplied by a gear-type pump, driven by a 2-h.p. motor.

Workpieces of diameters from 0·15 to 0·4 in., and lengths from 1·18 to 2·36 in., can be handled on the machine, the maximum length of thread being 1·96 in. Pitches from 0·019 to 0·059 in. can be produced, and the rolls are of 6 in. diameter. A 4·7-h.p. motor drives the roll shafts, and there is a choice of four speeds from 16 to 63 r.p.m. With the set-up shown, the stud blanks are fed to the rolls automatically by means of a magnetic plate whereby they are picked up from the hopper above the machine.

This hopper is shown more clearly in the close-up view, Fig. 11, where the magnetic disc, which is driven at slow speed by a small motor, is indicated at *B*. The inclined sides of the hopper cause the stud blanks to rest in contact with the face of the magnetic disc, which rotates in the clockwise direction as here viewed, and they are continuously carried upwards at the left. Blanks which adhere to the disc at any position except near the edge are pushed back into the hopper by springs on the surrounding, fixed, housing, but those near the edge are carried past fences which align them correctly to enter the feed chute.

### ORIENTATING THE STUDS

On the studs shown, threads of 10-mm. (0·39-in.) diameter and 1·5-mm. (0·059-in.) pitch are rolled over a length of approximately 0·75 in. at each end, but to different classes of fit. The blanks, which are approximately 2·13 in. long, must therefore be fed with the appropriate end foremost, to ensure that the diameters machined to suit the different classes of fit are presented to the rolls correctly. To enable correct orientation of the blanks to be ensured, one end of each is machined with a rounded profile, and the other end flat. As the blanks are carried round on the disc, those with the flat ends leading are brought into contact with a flat-surfaced projection which prevents them from passing.

Continued travel of the disc causes a blank which has thus been arrested to swing round so that it is delivered into the chute *C* with the rounded end, which was originally to the rear, downwards. Blanks which have the rounded ends leading pass over the projection by virtue of the curved form, and are carried into the second chute *D*, down which they pass, again with the rounded ends downwards. The blanks continue down the chute, pass a point at which there is a micro-switch whereby the supply is controlled to a feed position at the lower end. Here, they enter a vertical magazine, above the stationary roll, in which the axis of each blank is aligned with that of the roll.

Surrounding this roll there is a feed drum of built-up construction, with slots into which blanks are delivered. This drum is indexed intermittently, so that the blanks are carried round, in turn, to the rolling position. The moving die is then advanced, and the threads are rolled, before the stud is carried downwards to a position at which it drops out of the slot and slides down a chute. An output of 40 studs per min. is obtained.

Features of other machine tools and sheet metal working machines exhibited by East German factories at Leipzig, also of an automatic hot-forging line, will be published in a forthcoming issue of MACHINERY.

---

AIRCRAFT JIGS FABRICATED BY WELDING.—It is reported that Vickers-Armstrongs (Aircraft), Ltd., are obtaining substantial savings from the use of metal arc welding for the fabrication of aircraft jigs. Previously, jigs were assembled from steel angle and channel sections, round bars, and tubes, by riveting, bolting, and—for close tolerance work—jig boring and pinning. Some jigs for the Vanguard were, however, produced by welding, and as a result of the experience gained, this form of construction has been adopted exclusively for the jigs required for the VC10 turbo jet aircraft.

Prefabricated standard box sections, measuring 6 by 6 in. and 10 by 6 in., of stock lengths, are employed, and the metal arc welding is carried out with Philips C23 iron power electrodes, and type 68 all-position electrodes for work performed on site. Apart from the savings in cost, the time required for jig construction has been considerably reduced. The sole distributors for Philips welding electrodes in the United Kingdom are Research & Control Instruments, Ltd., 207 Kings Cross Road, London, W.C.1.

# NEW PRODUCTION EQUIPMENT

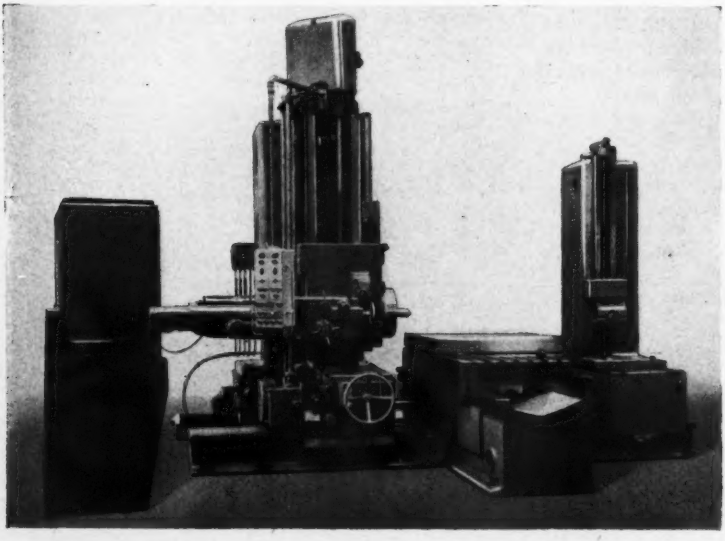
Edited by
G. W. Mason
and
A. J. Barker

## Kearns Model 451 P Planer-table Type Horizontal Surfacing and Boring Machine with A.E.I. Control Equipment

The new Model 451 P planer-table type horizontal surfacing, boring, milling, drilling, and tapping machine shown in the illustration, has been specially built by H. W. Kearns & Co., Ltd., Broadheath, Altrincham, to take full advantage of the accuracy obtainable with the A.E.I. co-ordinate setting system. With this equipment, it is stated, the machine can be set to ±0·0002 in. either by means of punched cards or manually by dials built into the separate floor-mounted control console.

The 36- by 135-in. T-slotted table, which carries a 48- by 48-in. rotary table, has a maximum cross travel of 120 in., on guideways on the main bed, and the vertical traverse of the spindle head on the column ways is 60 in. A maximum distance of 60½ in. is obtainable between the centre line of the spindle and the top surface of the rotary table. A bed member, which is bolted to the left-hand side of the main bed has a channel-shaped slideway and outer ways for guiding the column saddle, and a traverse movement of 24 in. is provided by a screw in a direction parallel with the boring spindle. The central portion serves as an oil bath for the guiding surfaces and the traversing screw, and because they are continuously lubricated, smooth sliding movements are obtained, and "slip-stick" is reduced. A maximum distance of 90 in. is obtainable between the facing head on the boring spindle and the boring stay, which can be adjusted on centrally-disposed guideways on another bed member attached to the right-hand side of the main bed. If required, the machine can be supplied without a boring stay.

A 3-in. diameter boring and drilling spindle, with a No. 5 Morse taper bore at the nose end, is normally provided, but if required, the machine can be supplied with a 2½-in. spindle. Maximum travel of the spindle is 36 in., and 27 speeds, ranging from 6 to 750 r.p.m. are available, the drive being taken from a 7½-h.p. motor. Of new, patented, design, the facing head enables cuts to be taken on diameters up to 24 in., and a balanced drive for imparting radial feeds is transmitted by a differential bevel gear unit, through a large-diameter worm gear and two spiral pinions which engage with helical racks on opposite sides of the facing slide. Eighteen speeds are available for the facing head, which range from 6 to 297 r.p.m.



**Kearns Model 451 P planer-table type surfacing, boring, milling, drilling, and tapping machine with A.E.I. electronic co-ordinate setting equipment**

Steplessly - variable

feeds from ½ to 10 in. per min. are provided for the work-table in the transverse direction and the spindle head vertically, and these motions are derived from separate variable-speed servo motors, which can be brought into operation simultaneously, for instance, when surfaces are to be milled at an angle on the work. From each motor, drive is taken direct to a 2-speed gearbox. On the work-table there are two worms, which can be adjusted in an axial direction for eliminating backlash. For automatic positioning of the work-table and spindle head the operating speed of the servo motors is controlled down to zero to give the required co-ordinate settings.

A patented feed system provides two feed ranges for the boring spindle in an axial direction, the facing slide radially, and the column saddle longitudinally. There are six feeds in each range, which are designated "B" and "M," the former covering rates from 0·006 to 0·062 in. per spindle rev., and the latter, from ½ to 5 in. per min. A combination of high spindle speed and low rate from the "M" range gives a fine feed rate for boring operations, and either or both feed ranges can be halved or doubled if required. A screwcutting attachment is available for operation in conjunction with the "B" feed range, which enable threads in a wide range of pitches to be cut.

The card reader for the A.E.I. equipment may be brought into operation by controls on the console or by a push-button on the pendant unit which is mounted on a swivel arm attached to the column. Two sets of push-buttons are provided on the pendant, one of which controls the table traverse and the other the spindle head, for movement manually or under power feed, or for automatic positioning.

A wide range of equipment available for the machine includes the Kearns patent tool holder, and the rotary table with multiple lifting jacks, which was described in MACHINERY, 97/1470—28/12/60.

## Vero Hydro-Copier Hydraulic Copying Attachment

The Hydro-Copier hydraulic copying attachment recently introduced by Vero Precision Engineering, Ltd., South Mill Road, Regent's Park, Southampton, is a self-contained unit which can be readily mounted on the work-tables of most types of milling and slotting machines. It may be used to advantage for copy machining small as well as large batches of workpieces. In Fig. 1 the attachment is shown set up on a vertical milling machine, and a close-up view is given in Fig. 2.

A cast iron slide, mounted on anti-friction guideways in the base, carries a 13-in. diameter table for the work and a 10-in. diameter table for the template. When copy milling is in progress, these tables are driven at the same speed by a hydraulic motor through hardened steel worms and aluminium-bronze wormwheels. The wormwheels run in oil baths and are of split design to provide adjustment for backlash. A longitudinal travel of 6 in. is provided for the slide on the base guideways, and traverse movements are imparted by a specially-designed hydraulic cylinder under the control of a valve in the tracer head, which is operated by displacement of the stylus pin sideways in any direction, also vertically.

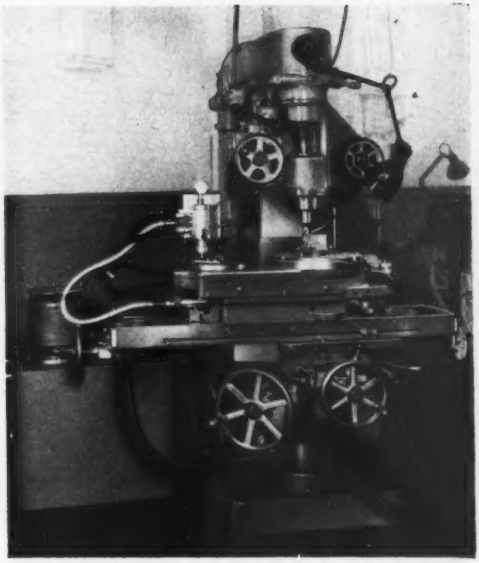


**Fig. 1. The new Vero Hydro-Copier hydraulic copying attachment is here shown set up on a vertical milling machine**

Mounted on a bracket attached to the rear of the slide, the tracer head can be adjusted in guideways for a maximum distance of 3 in. longitudinally and 4 in. vertically, and can be quickly positioned for copy milling internal and external profiles on the same workpiece, at a single setting. The attachment has a capacity for machining external profile shapes which can be contained within a circle of 15 in., and internal shapes within a circle of 9 in. maximum diameter. It has an overall height of 8⅝ in. A central bore and a tenon slot are provided in each table to facilitate setting the workpiece blank and the template in line, in prepara-

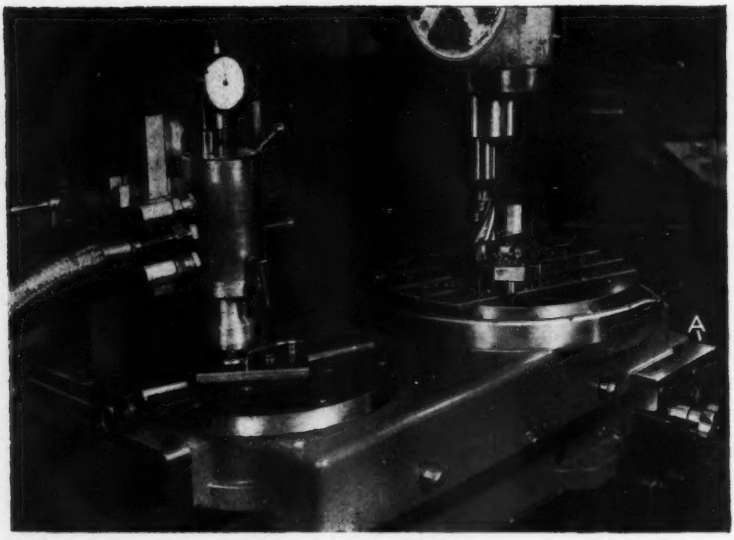



**Fig. 2. Close-up view of the Hydro-Copier copying attachment**

tion for copy milling. In addition, there are T-slots in the work-table for clamping the blank.

The operating speed of the work and template tables can be pre-set by means of a knob at the right-hand end of the base, to give feed rates within the range from 2 to 10 in. per min. A cam, which has an inclined lower edge, may be mounted on the slide above the control knob, as shown at *A* in Fig. 2, and in conjunction with a follower roller, provides for automatic variation of the table speed during the traversing motion. In this way, the cutting speed may be reduced when a small radius is to be copy milled, for instance, at the trailing edge of a turbine blade. As an indication of the accuracy obtainable with the attachment, it is stated that with the set-up shown, for copy milling a turbine blade over a depth of 2 in., the profile shape can be held within 0·0015 in.

A separate attachment is available, which can be bolted to the top face of the slide casting, to enable profile shapes to be copy milled in barrel-type cams and other cylindrical components, from flat templates. For such an operation, the part to be machined is mounted horizontally, and is held at one end either in a 3-jaw chuck or on a face-plate carried on the headstock spindle of the attachment, and supported at the other end by an adjustable tailstock centre. The attachment is located by a dowel in the slide casting, and a spigot which engages with the central bore in the work-table. Drive to the headstock spindle is taken by bevel gears from a vertical shaft fitted with dogs at its lower end which engage with the tenon slot in the work-table. With this arrangement, the cylindrical workpiece blank is driven at the same speed as the template table for copy milling. The headstock spindle and the vertical shaft run in preloaded taper roller bearings which ensure the necessary rigidity for high metal removal rates.

Oil for traversing the slide and driving the work and template tables is supplied at a pressure of 250 to 300 lb. per sq. in. by a pump driven by a 1¼-h.p. flange-mounted motor, which is built into a separate floor-mounted hydraulic unit. A tank incorporated in this unit has a capacity of 16 gal. of oil, and the pump will deliver a maximum of 5 gal. per min. A 3-in. diameter pressure gauge is provided. The unit is fitted with castors to facilitate movement on the shop floor, and two tubular steel members are usually attached to the ends of the tank to form a framework of inverted channel shape. Cross rollers are provided between the tubular members along the horizontal upper portion of the framework, for supporting the copying attachment when it has been removed from the machine. The attachment and the hydraulic unit can then be readily moved on the shop floor as a single assembly. If required, the top surface of the table on the machine can be brought level with the rollers, and the copying attachment can then be easily loaded or unloaded.

## Thompson Type CX Plunge-Matic Surface Grinding Machine

Machines displayed at the recent Machine Tool Exposition in Chicago by the Thompson Grinder Co., Springfield, Ohio, U.S.A., for whom the British agents are Rockwell Machine Tool Co., Ltd., Welsh Harp, Edgware Road, London, N.W.2, included the type CX Plunge-Matic 36- by 72-in. surface grinder shown in Fig. 1.

The wheel-head is traversed laterally for cross-

feeding, and a feature of the machine is that all vertical movements of the head, which has a travel of 48 in. on the column ways, are made under power, and are controlled from a Cybermatic pendant unit. Dials on this unit provide for varying the down-feed increments, which can be applied automatically at each reversal of the table traverse or the cross traverse of the wheel-head, from 0·0002 to 0·006 in. in steps of 0·0002 in., also for setting the total amount of down-feed up to a maximum of 1 in. The portion of the available travel over which down-feed is to be applied is re-set by means of a push-button. A rapid traverse of 20 in. per min. can also be obtained.

Drive to the wheel-head spindle, which runs in anti-friction bearings, is taken from a 50-h.p. motor, and a 20-in. diameter by 6-in. wide grinding wheel is fitted. A dressing unit is mounted on the side of the head, as seen in the close-up view Fig. 2, and is brought into use automatically. The increment of in-feed applied to this unit for each pass is pre-set by means of a further dial on the pendant, and compensation for the amount removed from the wheel is normally obtained under manual control. Provision can be made, however, for automatic compensation.

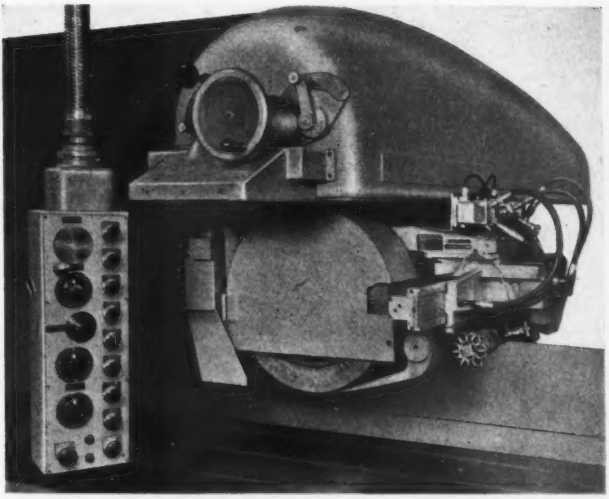


**Fig. 2. A close-up view showing the dressing unit and the control pendant on the Thompson grinding machine illustrated in Fig. 1**

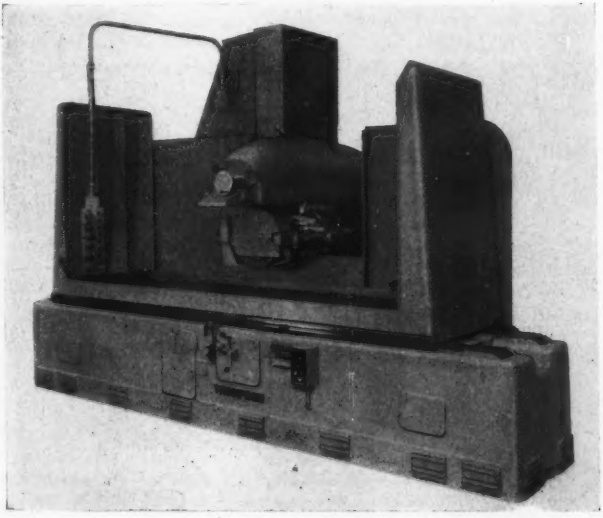


**Fig. 1. Thompson type CX Plunge-Matic surface grinding machine**

Carried on automatically-lubricated bed-ways, the work-table is reciprocated by two hydraulic cylinders, which serve to cushion the movement at either end of the stroke. The company's low-pressure Hydra-Cool hydraulic system is employed, whereby, it is claimed, distortion of the machine or the workpiece due to heating of the oil is avoided. With this system, the pump output and oil pressure are adjusted automatically to suit the requirements of the work.

## Hepworth 250 D.S. Hydraulic Die-sinking Attachment

In Fig. 1 (overleaf) is shown a small-capacity, quill-type, vertical milling machine, with the type 250 D.S. die-sinking attachment, which has recently been added to the range of hydraulic copying units made by Hepworth Iron Co. (Engineering), Ltd., Hazlehead, near Sheffield. A close-up view of the attachment is given in Fig. 2.

The piston rod of the built-in hydraulic operating cylinder is fixed at the upper end to a bracket which is interposed between the flanged end of the overarm on the milling machine and the cutter head, and the attachment is connected to the spindle quill by a clip of split design. With this arrangement, the spindle is moved in a vertical direction with the attachment under the control of the hydraulic valve in the tracer head. The tracer valve comprises a precision cartridge-type spool and liner assembly, and can be operated by movement of the stylus pin vertically and sideways in any direction.

Down feed, and sideways deflection of the stylus pin, can be adjusted by means of a knurled knob on top of the tracer head, and the entire attachment and the milling spindle can be raised to bring the cutter clear of the work at any point in the milling cycle, by movement of a lever. Mounted on a compound slide assembly, the tracer head can be adjusted in the vertical, transverse and longitudinal directions by separate knobs, and a micrometer drum is provided to facilitate setting the depth of cut to be taken on the work. Lever-operated clamps are fitted for securing the individual slides to the guideways. The operating cylinder has a working stroke of 2 in., and enables a maximum force of 300 lb. to be applied to the cutter. A force of about 6 oz. is applied to hold the tracer pin in contact with the workpiece master, and it is stated that, in certain circumstances, the attachment enables profile shapes to be reproduced to an accuracy of ±0·001 in.

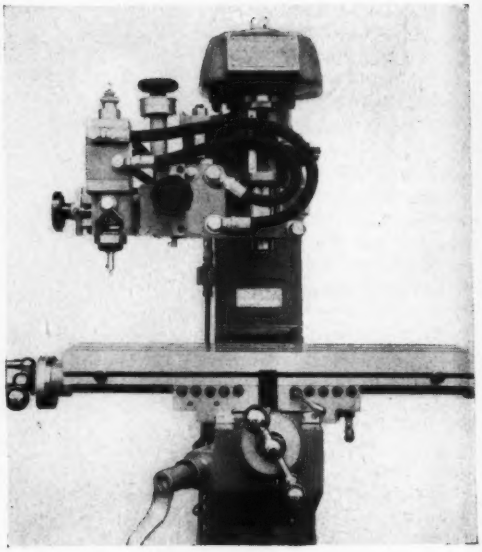


**Fig. 2. Close-up view of the Hepworth type 250 D.S. die-sinking attachment**

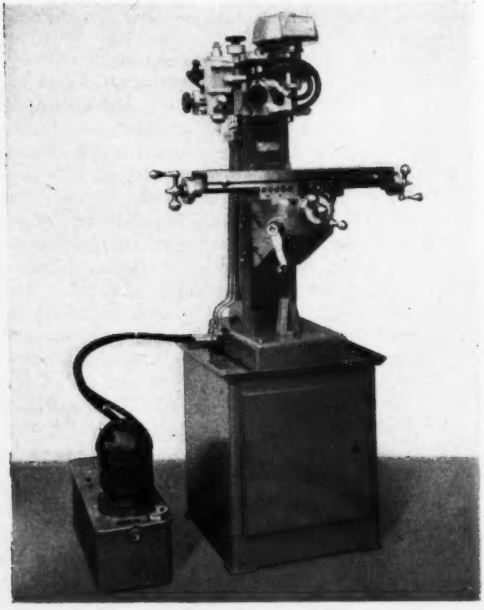


**Fig. 1. The Hepworth type 250 D.S. hydraulic die-sinking attachment is here shown mounted on a small-capacity vertical milling machine**

Driven by a ½-h.p. flange-mounted motor, the pump built into the separate floor-mounted hydraulic unit, will deliver a maximum of ½ gal. of oil per min. at 300 lb. per sq. in. pressure. The pump and other component parts of the hydraulic equipment, are mounted on the top cover of the 5 gal. capacity tank, so that they can be readily removed for maintenance purposes without the need for draining the oil.

## SHW Type UF2 Omniplex Toolroom Milling Machine

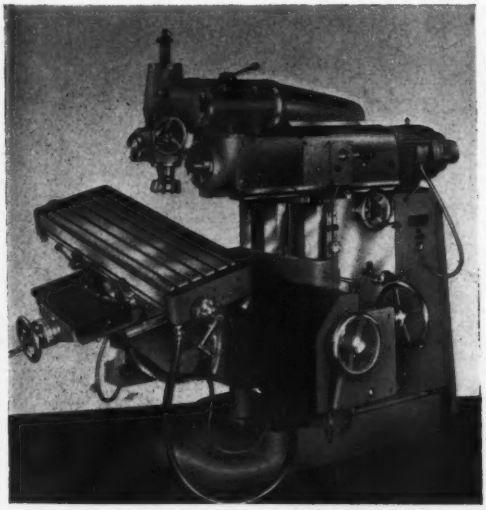
Design improvements have been made recently to the type UF2 Omniplex universal toolroom milling machine built by Schwabische Huttenwerke G.m.b.H., Wasseralfingen, Germany, which was described in MACHINERY, 88/1155—22/6/56, and the latest version is shown in the accompanying figure. It is marketed in this country by Stanley Howard, Ltd., 73 Devon Street, Birmingham, 7.

Alterations have been made to the turret unit carried on the ram-type horizontal cutter head, and it now incorporates an overarm—in addition to the auxiliary vertical milling and slotting heads—and is permanently mounted on a vertical pivot. The auxiliary heads are both of the swivel type, and the maximum spindle travel and slotting stroke is 4 in. Transverse adjustment of the ram-type head, over a distance of 17$\frac{5}{16}$ in., can be effected by hand or power. No. 5 Morse taper bores are normally provided at the nose ends of the spindles, but these members can be bored to ISA 40 or 50, if required. Drive is taken from a 4·7-h.p. motor, which is mounted at the rear end of the ram-type head, and there are 18 spindle speeds from 35 to 2,240 r.p.m.

The width of the work-table is unchanged, at 15¾ in., but the length has been increased and may be either 42½ or 50½ in. Vertical travel of the saddle assembly is now 17$\frac{5}{16}$ in., and the maximum distance obtainable between the axis of the horizontal cutter spindle and the table surface is 18$\frac{13}{32}$ in. Handwheels for the traversing motions incorporate graduated drums, and provision is made for the use of slip gauges and length bars, for accurate positioning. The 9 feeds available range from $\frac{15}{32}$ in. to 10 in. per min., and drive is taken from a separate 1·5-h.p. motor. Rapid traverse for movement of the saddle assembly longitudinally is at a speed four times that of the selected feed.

Coolant equipment is provided, and the machine weighs approximately 3 tons 4 cwt. and requires floor space of 9 ft. 4 in. by 8 ft. 2 in.

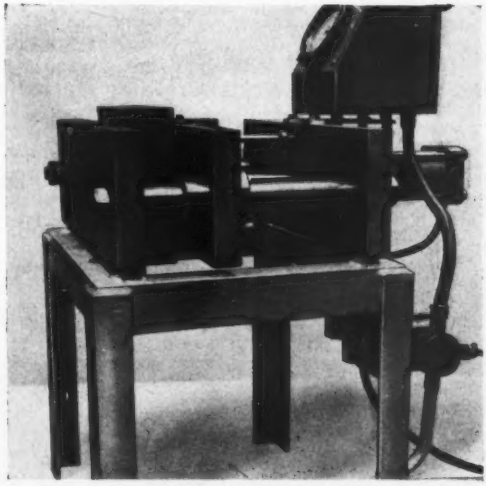
Designated UF1, an alternative version of this machine is now available, and has a work-table measuring 15¾ by 31 in. A maximum distance of 23⅜ in. can be obtained between the table surface and the axis of the horizontal spindle.



**On the latest version of the SHW type UF2 Omniplex toolroom milling machine, here shown, the turret unit, with vertical milling and slotting heads, also incorporates an overarm, for horizontal milling**

## Autocaster Semi-automatic Gravity Die Casting Machines

Designated the Autocaster Minor and Major, semi-automatic gravity die casting machines with platen areas of 12 by 8 in. and 14 in. square, respectively, have been introduced recently by Fringevision, Ltd., Elcot Lane, Marlborough, Wilts., and the smaller size is shown in the accompanying figure.



**Autocaster Minor semi-automatic gravity die casting machine**

In operation, the working cycle is initiated by means of a foot switch. The moving platen, which is carried on two cylindrical guide bars, is then advanced, through a maximum distance of 6 or 9 in. according to the size of the machine, in readiness for pouring, and the latter operation is performed manually. Movement of the platen is accomplished in approximately 1 sec., and motion is imparted by an air cylinder, which is normally of 3 and 4 in. diameter on the smaller and larger

machines, and provides a clamping force of 177 to 1,060 and 314 to 1,885 lb., when using compressed air at 25 to 150 lb. per sq. in. The period for which the die is closed is controlled by a time switch, that is brought into operation automatically, and can be varied from 10 sec. to 5 min. After the pre-set period has elapsed, the moving platen is returned to the original position, and a back-plate provides for operation of ejector pins during the final stage of this movement.

Experience gained with the larger machine in the company's foundry has shown that a single operator can tend six units, without fatigue, and it is stated that considerable savings can be obtained.

A floor space of 3 ft. 2 in. by 1 ft. 8 in. is required, and the weight is approximately 4½ cwt.

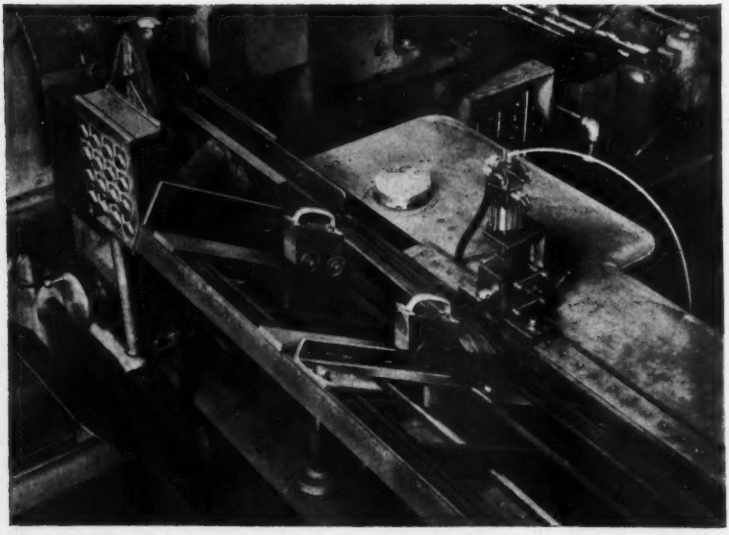
## Mattison Loading Unit for a Duplex, Disc-type Grinding Machine

Reference was made in MACHINERY, 97/566—7/9/60, to a chain conveyor feed for a duplex, disc-type grinding machine, which has been developed by Mattison Machine Works, Rockford, Ill., U.S.A., and a close-up view of the unit is shown in the accompanying illustration.

The unit extends laterally from the machine, and the framework incorporates the inclined table seen in the foreground, which serves as a magazine. Workpieces are urged downwards, across this table, by weights supported on wheels, and are successively removed by the feed chain from the lower end of the stack. The design of the closely-spaced links of this chain is such that those members which interfere with the component are moved into "neutral" positions, and the following link engages the rear end of the work, to impart forward motion. With this arrangement, components which vary in size can be accommodated without the need for re-setting.

Attention was drawn in the earlier article to the productive capacity of the machine with which this unit is employed, and it may be noted that drive to the wheel-spindles is taken from motors of 50 h.p. A positive wheel-feed system is incorporated, and a dial is provided to indicate wheel wear. Compensation for wear is made, under manual control, by an air-operated ratchet mechanism.

British agents for Mattison Machine Works are Gaston E. Marbaix, Ltd., Devonshire House, Vicarage Crescent, London, S.W.11.



**Workpieces of various sizes can be handled, without the need for re-setting, by this Mattison chain feed unit for a duplex, disc-type grinding machine**

---

VPE 200 PLASTICS COATINGS. A new group of polyester resins, known as VPE 200, has been introduced by The Goodyear Tyre & Rubber Co., Chemical Divisions. These resins, it is stated, provide coatings with excellent resistance to abrasion, ultra-violet rays, chemicals, and atmospheric conditions. It is also claimed that they have good adhesion and electrical properties. Clear, tinted, or coloured coatings can be applied to metal parts, such as motor bumpers and wheel covers, and the resins can also be employed for protective and decorative finishes on architectural aluminium and aluminium foil, and in wood stains, primers, and finishes. Coatings can be applied by various methods, including spraying, dipping, and brushing.

Hubron Sales, Ltd., Failsworth, Manchester, are sole distributors for VPE 200 resins in the United Kingdom.

# Machine Shop Patents

## FEED ARRANGEMENT FOR LATHE TAILSTOCK QUILL

A sectioned side elevation of a lathe tailstock is shown in the accompanying figure, and the unit is arranged for transmitting power feed to the quill. In addition, axial movement can be obtained under two systems of hand control.

Rack teeth are cut on the quill, and mesh with a pinion *A*, which is secured to a vertical shaft *B* within the tailstock body. This shaft is mounted in a plain bearing at the lower end, and is located at the top by the spigoted hub *C*, which is prevented from moving axially by a retaining ring. Pivoted on a horizontal pin in this hub, the lever *D* is engaged in a transverse slot in the shaft, and provides for moving the latter axially to three positions. The shaft is located and retained at these positions by a spring-loaded ball, which engages annular grooves.

When the shaft is set in the position shown in the illustration, pinion teeth cut close to the lower end mesh with the rack bar *E*, which is carried in guide holes in the tailstock and can be connected to the saddle by a removable pin. Application of power feed to the saddle then causes this bar to be moved axially, and motion is transmitted through the gearing to the tailstock quill.

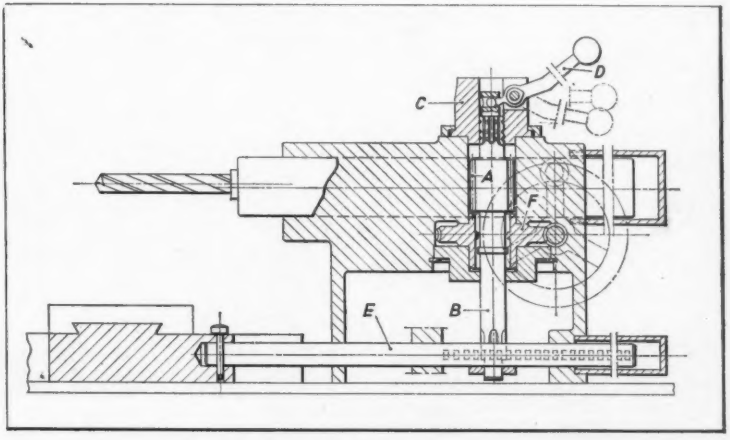
The pinion teeth on the shaft *B* are disengaged from the rack bar *E* when the shaft is raised to the mid-position, and the lever *D* then serves as a capstan handle, for rotating the hub *C*. Since this hub is splined to the upper end of the vertical shaft, the motion is transmitted through the gearing to the quill. Sensitive control is thus provided, as may be desirable for tapping operations, for example. When the shaft *B* is set to the upper position, a further splined portion is engaged with corresponding splines in the bore of the wormwheel *F*. Axial movement of the quill is then obtained by means of a hand-wheel and worm.

858,740. Ets. A. Cazeneuve, 7 rue des Fruitiers, La Plaine Saint-Denis (Seine), France, and H. R. Bruet. *[Application date in France, July 22, 1958. Published, January 11, 1961.]*

## AUTOMATIC FEED ARRANGEMENT FOR AN INTERNAL GRINDING ATTACHMENT

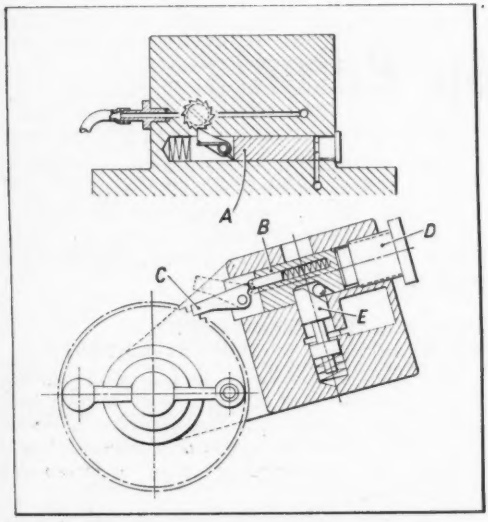
The arrangement shown in the accompanying drawing is intended for use with a traversing spindle-type internal grinding attachment, which is mounted on the cross-slide of a lathe, and provides for the automatic application of increments of cross-feed.

A valve is operated at each reversal of axial traverse of the grinding head spindle, to admit compressed air momentarily to the right-hand side of the piston *A*, in the upper view. The resultant movement of this piston causes the pawl at the leading end to turn the associated ratchet wheel through one tooth space. In this way, a diametral hole in the transverse shaft carrying the wheel is brought into position, after each half-revolution, to connect the two portions of a compressed air passage, which is drilled at right-angles to the shaft axis. It will be evident that the frequency with




**Sectional side elevation of a lathe tailstock, which incorporates provision for transmitting power feed to the quill**

M




**Arrangement whereby cross-feed increments are applied automatically, at regular intervals, when using an internal grinding attachment on a lathe**

which this connection is made is dependent upon the number of teeth on the ratchet wheel.

When the two portions of the passage are connected, compressed air is delivered, through flexible tubing, to the right-hand side of a piston *B*, in the lower view, which is housed in a separate block secured to a flange at the front of the cross-slide. Movement of this piston causes the pawl *C* at the leading end to turn the associated ratchet wheel, which is mounted on the slide traversing screw. The size of the feed increment thus applied can be adjusted by means of the stop screw *D*, which provides for altering the length of stroke of the piston. To prevent shock, forward movement of the piston takes place against the retarding effect of the spring-loaded, hydraulically-damped, plunger *E*. This plunger is depressed during the movement, a ball being interposed between the inclined faces at its upper end and at the rear of a recess in the piston, to reduce friction.

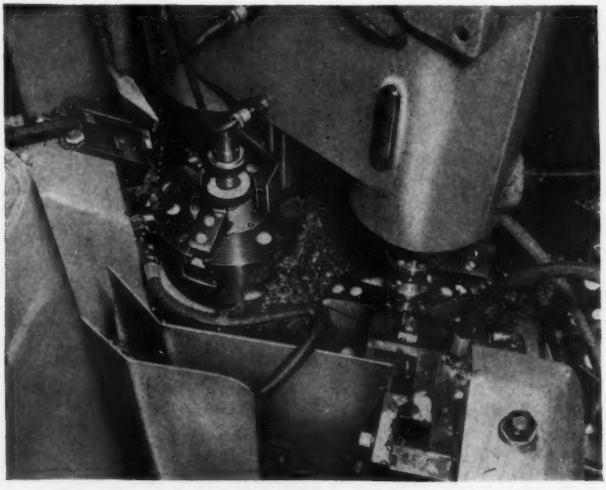
Feed is disengaged by swinging the pawl *C* upwards to the position shown by broken lines, where it is held by means of a spring-loaded plunger housed in the piston.

856,809. Hugo Allemann Aktien Gesellschaft, Luterbach/Solothurn, Switzerland. *[Application date in Switzerland, March 2, 1956. Published December 21, 1960.]*

## Use of Interrupted Feed for Chip-breaking

Details of the set-up, on a Ryder No. 10/8 Verticalauto, for machining cluster gears from steel forgings for the Victor passenger car made by Vauxhall Motors, Ltd., Luton, were given in an article in MACHINERY, 97/57—6/7/60. A difficulty encountered when production was begun on this machine was concerned with the formation of swarf in long lengths, which rapidly became entangled with the work and the tooling, interfered with the automatic clamping sequence, and was not removed by the sweeping fingers normally fitted for the disposal of cast iron swarf. The two finishing spindles on this machine are seen in the accompanying illustration, which also shows the broken form of the chips now produced.

Feed rates range from 110 to 222 cuts per inch, and the small chips are obtained by switching the magnetic feed clutch in and out repeatedly. At each interruption of the feed movement the chip breaks off.



**Close-up view of the two finishing stations on the Ryder Verticalauto employed for machining steel cluster gear forgings at the works of Vauxhall Motors, Ltd. Small chips are obtained by feeding the tools intermittently**

# NEWS OF THE INDUSTRY

## Cheshire

ESSEX TOOL & GAUGE CO., LTD., Navigation Road, Altrincham, report a continued increase in the demand for their range of engineering inspection equipment which includes sine plates, caliper and plug type gauges, centre sine bars, bench centres, and test bars of both standard and the ball-end types. We are informed that a satisfactory volume of orders and enquiries has been received for the all-steel compound sine plate which was recently introduced.

It may be noted that other activities of the company include the production of offset boring heads to the special requirements of customers, and the production, to specification, of jigs, fixtures, special tools, and gauges.

EDWARD HOLME & CO. (1931), LTD., Moss Lane, Altrincham, makers of electrical control gear, are experiencing a brisk demand for their range of equipment. A large volume of orders is at present in hand for control panels for emergency lighting equipment and change-over contactor units for railway signalling.

Other work in progress includes control panels and desks for waterworks installations; special crane equipment; controls for sugar plants and steel works equipment; and Korndorfer type starters.

In addition a good volume of orders is being received from various industries for die castings.

THE CHURCHILL MACHINE TOOL CO., LTD., Broadheath, Altrincham, inform us that whereas a large volume of orders is in hand for all machines in their range they are experiencing an unparalleled demand for the large roll grinders. Machines recently despatched from the works have included a number for the U.S.A., South Africa, Brazil, and Czechoslovakia.

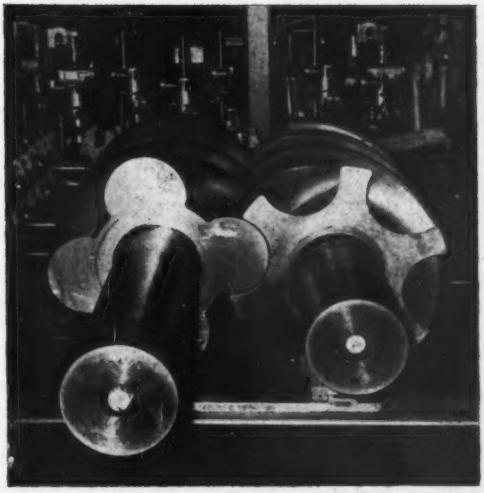
Machines in progress include numerous roll grinders of various sizes; a heavy plain grinding machine with a length capacity of 120 in.; internal grinding machines of both the automatic and non-automatic types, a number of the latter being destined for India and France; a cylinder grinding machine for export to Africa; and batches of standard plain, piston ring and surface, universal, and slideway grinders. Mention may also be made of a number of small semi-universal type grinding machines, which, we are informed, are in good request from technical colleges and training centres.

The company will exhibit three machines from the range at the forthcoming British Trade Fair in Moscow, namely a type B.W. plain grinder; a type H.B.M. internal and face grinder; and a type E.C. centreless grinder, all of which will be provided with automatic loading equipment, and arranged for automatic wheel truing and compensation.

P. I. CASTINGS (ALTRINCHAM), LTD., Atlantic Street, Broadheath, Altrincham, are experiencing an increasing call on their services as makers of pre-

❖ ❖ ❖

**The pair of 800 mm. diameter rotors shown in the figure, for a compressor designed by Svenska Rotor Maskiner A.B., Stockholm, were recently machined by John Holroyd & Co., Ltd., Milnrow, for the Kobe Steel Works, Ltd., Japan. They were produced on a Holroyd machine, developed for the purpose, and now built in a range covering capacities from 2 to 32-in. diameter. The compressor will form a part of blast furnace equipment which Kobe Steel Works are building under licence from Svenska Rotor Maskiner**



cision castings from a steadily widening range of industries.

Additional factory space of some 7,000 sq. ft. has recently been brought into operation and is used for the dressing, finishing and inspection departments. It has thus been possible to increase the production area in the original works to provide for the rising volume of output required.

The company will participate in the forthcoming Engineering, Materials and Design Exhibition at Earls Court, London.

TAYLOR TOOLS AND SUPPLIES, LTD., Atlantic Street, Broadheath, Altrincham, are busy with the production of their range of machines and equipment for users in this country, and for various export markets. Machines now in progress in the works include a number of automatic, 9-in., wet-belt grinders; high-speed back-stand grinders of both the single and double types; combined grinding and polishing machines; and centreless type grinders with 6-in. wide belts.

The company undertakes the design and production of work holding fixtures, for use on the machines, to suit individual components, and the section of the factory devoted to this work is at present exceptionally busy.

CHARLES S. MADAN & CO., LTD., Atlantic Street, Broadheath, Altrincham, report a continued heavy demand for their range of products. It may be noted that Airhydropump units and valves are now being built for pressures up to 100,000 lb. per sq. in., and that all components for these units are tested at 120,000 lb. per sq. in.

The range of revolving centres for lathes, of both pipe and standard types, made by the company, is in steady demand from both builders and users of machine tools.

H. W. KEARNS & CO., LTD., Atlantic Street, Broadheath, Altrincham, report a satisfactory order position, as regards both the home and the export markets, for their full range of machine tools. Export orders now in hand include a number from Japan, and we are informed that the company has recently exhibited a machine in that country. In addition, certain machines, to which we hope to make further reference at a later date, will be on view at the 7th European Machine Tool Exhibition to be held at Brussels in September.

To facilitate the company's research and development programme, an addition to the works has been built, which includes a temperature controlled dust free assembly room. This section will be devoted to production tests on existing designs and the building and testing of all prototype machines and equipment. Plans are now in hand for building a new office block.

Machines and equipment recently installed in the works include a Snow slideway grinder and a Kearns electronic, type 451P, planer table type horizontal surfacing and boring machine, with A.E.I. automatic co-ordinate setting.

A recent development by the company is a twin spiral type patent facing chuck, which we hope to describe in a future issue of MACHINERY.

CLARE-COLLETS, LTD., Broadheath, Altrincham, inform us that there is a steadily increasing call for their full range of patent milling chucks and equipment, also for standard and special milling cutters, routing cutters, and end mills. During recent months, the demand for milling equipment for use on plano-milling machines and floor-type boring machines has greatly increased.

THE NORTHERN AUTOMATIC SCREW CO., LTD., Golf Road, Hale, makers of turned and screwed components of many types, inform us that they are experiencing an increasing demand for their services from a variety of users, including the aircraft, machine tool, printing machinery, and domestic appliance manufacturing industries.

To enable production to be increased, an extension to the works has recently been built and we are informed that this section is now in full operation.

BARBER & COLMAN, LTD., Marsland Road, Brooklands, Sale, report a continued steady request for their range of machine tools from customers both at home and overseas.

There is an exceptional demand at present for hobs for cutting gears, ratchet wheels, sprockets, chain-wheels, serrations and splines, and the cutter re-sharpening and servicing department is receiving a steady flow of work.

RUBERT & CO., LTD., Acru Works, Demmings Road, Councillor Lane, Cheadle, report full capacity working on their range of engineers' inspection and metrology equipment. We are informed that the demand for the recently introduced range of "B" blocks is well maintained and that the Rubert-Hommel electro-mechanical comparator, as described in MACHINERY, 94/1077—13/5/59, is now being made by the company. The unit is equipped with a Microcontac high precision dial gauge, and lights on an indicator unit show whether a component is within, above, or below, the pre-set limits.

This company markets in the United Kingdom Technovit cold curing, non-shrinking resin, which is principally intended for reproducing the shape

and surface texture of a workpiece to enable the surface roughness to be measured. Recent developments in connection with the application of this resin have been concerned with the joining of metals. Mechanical tests are shortly to be carried out on various pieces which have been joined in this way, and we hope to publish details later.

ACRU ELECTRICAL TOOL MANUFACTURING CO., LTD., Acru Works, Cheadle, report a good demand for electric soldering irons, branding irons, and plastics sealers, also a steady flow of orders for the range of neon indicator lamps. This company has recently acquired the United Kingdom agency for an electrical porosity detector made by Electro-Physik, Köln. The equipment is available in two forms, one covering a voltage range from 200 to 3,000, and the other, from 3,000 to 20,000. It is stated that porosity in lacquer coatings on any metal base can be detected.

JOSHUA HEAP & CO., LTD., Oldham Road, Ashton-under-Lyne, are busy with the production of screwing machines ranging up to 12 in. diameter pipe capacity and 4 in. diameter bolt capacity, also dies for use on these machines.

Among those recently despatched from the works was a special machine for forming fabric and resin pipe ends for use in the chemical industry. A constant flow of work is reported by the die-recutting and sharpening department.

We are informed that a slideway grinder was recently installed in the works.

R. SUTCLIFFE.

## Developments in Mechanical Applications of Magnetic Force

(*Continued from page* 1043)

plete units, which can be set at any angle from the horizontal to the vertical, and magnetic systems are sometimes employed for transferring parts from hoppers for delivery into feed chutes.

As representative of what may be termed dynamic applications of magnetic force, reference may be made to electro-magnetic presses for light work, on which the blow energy can be steplessly varied, and to magnetic force welding. With the latter system, electrode force is produced by an electro-magnet which is energized by the welding current, and very accurate synchronization of force and current is thus obtained.

There are, of course, many other practical uses for magnetic force, and among the best known are lifting, and holding parts in position for welding. A type of unit which is achieving increasing prominence by reason of the convenience it affords is the magnetic base. Such bases are made in small sizes for dial indicator stands and provide a secure mounting on horizontal and vertical surfaces. Larger bases accommodate stands for portable power tools and provide sufficient adhesion to enable heavy drilling operations to be carried out *in situ*.

It will be evident from this necessarily brief review that magnetic force can be usefully applied for a great diversity of purposes, and there is no doubt that it will be much more widely adopted in the future with more general appreciation of the potentialities.

## Black & Decker Portable Electric Drill

A new portable electric drill has been developed by Black & Decker, Ltd., Harmondsworth, Middlesex, which eliminates the need for a flexible cable to connect it to an electrical supply. The prototype is shown in use in the accompanying illustration.

Weighing only 4 lb., the drill incorporates a series of power cells, which drive a totally-enclosed motor that is claimed to be proof against overload damage. Holes up to ¼ in. diameter can be drilled in steel plate, and it is stated that some 75 holes of ⅝ in. diameter may be drilled in ¾ in. thick wood, for example, before the cells need to be recharged. For this purpose, the company has introduced a mains-operated charging unit which can be set to re-energize the cells fully in 5 hours. Alternatively, a low charging rate can be selected for overnight use. This charging operation can be effected about 400 times before the cells must be replaced.

**New Black & Decker portable electric drill with self-contained power source**

## Machine Tool Orders and Deliveries

Revised figures for 1960 have now been issued by the Machine Tool Trades Association on the basis of additional returns received from smaller companies which supply figures annually. The figures given below in parentheses indicate the portions accounted for by export trade.

Deliveries during the year amounted to £94,932,000 (£24,306,000) as compared with £78,858,000 (£18,552,000) for 1959. Net new orders placed in 1960 were valued at £144,748,000 (£32,866,000), whereas in 1959 the total was £80,275,000 (£18,217,000). As a result, the value of orders in hand rose to £105,704,000 (£24,297,000) at the end of 1960, as against £55,891,000 (£15,740,000) at the end of 1959.

On the export side there is a substantial and increasing volume of orders from Australia, India, West Germany, Sweden, Italy, and Japan.

It is pointed out that whereas the index of industrial production showed an increase of 10 per cent in 1960 for the mechanical engineering industry as a whole, for machine tools the rise was 21 per cent. For the year, United Kingdom exports as a whole rose by 6 per cent, mechanical engineering exports by 14 per cent, and machine tool exports by 31 per cent. These results were achieved for an increase in employment in the machine tool industry of less than 2 per cent.

## Engineering Salary Survey in U.S.A.

According to a survey carried out in the U.S.A. by the Engineering Manpower Commission, engineers' salary levels in that country rose by approximately 5 per cent per year between 1958 and 1960, and the average salary is now $9,600. This increase compares with an average of 6½ per cent between the years 1953 and 1958. In 1953 the average salary was $6,500.

The report covers approximately 200,000 engineering graduates in industry, education, and government departments. The average age of the engineers was 32, and it was found that salaries increased more rapidly during the early years of an engineer's career, but that this tendency was becoming less pronounced. There is a marked difference between engineering salaries in industry, education and government departments, with the highest level in industry, followed by education. Attention may be drawn to the fact that between 1958 and 1960 there was an increase of 14·3 per cent in the salaries of engineering teachers.

## Coming Events

INSTITUTION OF PRODUCTION ENGINEERS. *London-Brighton Group*. May 17, at 7 p.m., at the Old Ship Hotel, King's Road, Brighton; lecture on "Cost Accounting's Contribution to Production Efficiency," by S. C. Comber and R. E. Turner.

## Personal

MR. JOHN RIERA has resigned from the board of James Archdale & Co., Ltd., Worcester, a member company of the Staveley Group.

MR. E. T. WESTWOOD, formerly with Gate Machinery Co., Ltd., has joined Frye Machine Tool Co., Ltd., Poyle Road, Colnbrook, Bucks. He will concentrate on introducing the company's lines to the merchant trade.

MR. J. H. BEST, sales representative for Noble & Lund, Ltd., Felling, Gateshead, 10, has moved to 39 Britwell Road, Sutton Coldfield, Warwicks. (telephone, Sutton Coldfield 5811), and MR. A. S. EVANS, also a sales representative for the company, to 20 Thornefield Crescent, Tingley, Nr. Wakefield, Yorks. (telephone, Morley 4310).

MR. J. G. FAHEY, for many years a director of the Elgar Machine Tool Co., Ltd., has resigned his appointment to join Mr. G. E. B. Taylor, a former colleague, on the board of Ringway Machine Tools, Ltd., 42 Barton Arcade, Manchester 3. He will be responsible for the company's activities in the Midlands.

MR. D. S. WOODLEY, M.I.Mech.E., M.I.H.V.E., will retire from the office of managing director of Keith Blackman, Ltd., Mill Mead Road, London, N.17, on May 31, but will remain as chairman and consultant to the company. MR. F. W. GOODGE will become managing director on June 1, and MR. C. J. ATKINS, assistant managing director.

MR. W. E. BARDGETT, research manager in the research and development department of The United Steel Companies Ltd., The Mount, Broomhill, Sheffield, 10, will retire from this position on July 1, but will remain with the department as a consultant. DR. K. J. IRVINE, at present deputy research manager, will succeed Mr. Bardgett with the title of metallurgical research manager.

MR. WILLIAM HOLLICK, A.M.I.Mech.E., senior engineer advising on mechanical handling equipment at Unilever Ltd., has received the 1961 John Morris Memorial Award of the British Industrial Truck Association, York Mansion, 94-98 Petty France, London, S.W.1. The award was made for a paper entitled "The Design of Warehouse and Storage Areas to Allow Efficient Handling by Industrial Trucks," and Mr. Hollick will attend the 8th Annual Material Handling Course at Lake Placid, New York, from June 18 to 30.

The following new appointments have been announced:

MR. B. J. REDMAN as works manager of the new plant of Waller Engineering, Ltd., at Millbrook Trading Estate, Southampton.

MR. P. FARQUHARSON, as representative for The Globe Pneumatic Engineering Co., Ltd., Ashton Road, Harold Hill, Essex, in Lancashire, Cheshire, and North Wales.

MR. R. T. MILLER as managing director, and Mr. A. George as assistant managing director of Fletcher Miller, Ltd., Hyde, Nr. Manchester, a member company of the Castrol Group.

MR. A. H. COLLINSON, formerly manager of the Replacement Sales Department of Ferodo, Ltd., Chapel-en-le-Frith, as district manager for the company in Leeds, following the retirement of Mr. F. Booth. Mr. Collinson has been succeeded in his former post by MR. K. RAVENHILL.

MR. A. W. K. HORTON, formerly senior representative at Birmingham for Mutual Finance, Ltd., as manager of the Birmingham Branch, at 15 Chamber of Commerce House, 75 Harbourne Road, Edgbaston, in succession to Mr. T. W. Sullivan, who has resigned from the service of the company.

MR. E. J. GIBSON, as supervisor, manufacturing services, European area, for Kelvinator, Ltd., Chiswick Flyover, Great West Road, London, W.4. The position carries responsibility to Kelvinator International Corporation, Detroit, U.S.A., for advising existing licensees in all aspects of refrigerator manufacture, and assisting new licensees in setting up production arrangements.

## Scrap Metals

†LONDON.—‡Prices per ton for non-ferrous scrap metals free from iron are as follows:—Clean copper wire, untinned and free from lead and solder, £200; clean heavy copper, untinned and free from lead and solder, £195; copper wire No. 2, £189; clean light copper, £185; braziery copper, £171; gunmetal, £179; brass, mixed, £130; lead, net, £54; zinc, £45; cast aluminium, £102; old rolled aluminium, £105; battery lead, £27; unsweated brass radiators, £105; hollow pewter, £540; black pewter, £420.

MIDLANDS.—Trade in non-ferrous scrap generally appears to have maintained the improvement shown in recent weeks, which, it may be inferred, is due in no small measure to steady conditions existing in small- and medium-sized engineering firms, together with a brighter future outlook for the motor industry.

Market trends indicate the strength of tin and copper, as both these metals have increased in value. The future of tin would appear to be firmer than that of copper, unless disturbing influences in the Congo should cause concern over supplies of the latter metal.

The following notes indicate the general tone of the scrap-metal market:—

*Copper.*—Prices for most grades are higher by approximately £3 per ton. Outlets are readily available and attractive prices are obtainable for heavy, No. 1 wire, rod and bar materials.

*Brass.*—Good conditions continue, and mixed brass has improved by £1-2 per ton.

*Gunmetal.*—The market is very steady, with further slight increases. Commercial phosphor-bronze and material to known specification command better prices.

*Lead.*—A further small rise in value has resulted from a slight increase in demand.

*Aluminium.*—The recent hopeful indications with regard to this metal and its alloys are slow to materialize into a general improvement. Prices being offered by works differ by as much as £10-12 per ton, and merchants emphasize the caution with which these materials are being treated at present.

*Zinc.*—Hardly any alteration in value, demand in general favouring die casting scrap.

† George Cohen, Sons & Co., Ltd., 600 Wood Lane, London, W.12.
‡ Subject to market fluctuations.


**MACHINERY'S ENQUIRY BUREAU**

**For many years MACHINERY has provided an enquiry service not only for subscribers and advertisers but for all engineers in need of such information as the names of makers—or their agents—of machines or equipment for performing particular operations, suppliers of various classes of material, firms with facilities for undertaking certain types of work, owners of trade names, and agents for foreign machine builders. If you have such a problem write (MACHINERY, Enquiry Bureau, Clifton House, 83-117 Euston Road, London, N.W.1) or telephone (Euston 8441, 2 lines). This service is, of course, entirely free.**

**The Price of a Subscription to MACHINERY is 52 Shillings per annum, post free, to any part of the world.**

***Subscribers are not bound for any definite period of subscription. We send MACHINERY, post free, each week until told to stop. Subscribers can pay yearly, half-yearly, or quarterly, pro rata. (Cash with order.)***

**To MACHINERY, National House, 21 West Street, Brighton, 1.**

***Please send me/us MACHINERY every week until I/we tell you to stop, for which I/we enclose remittance of 52 Shillings per annum or pro rata***

*Name* .....

*Address* .....

.....

**Position* .....

**Firm* .....

*For our mailing records only.

***MACHINERY can be obtained by single copies or subscription through your local newsagent.***

10/5/61

**MANUSCRIPTS FOR BOOKS covering all branches of engineering production will receive careful consideration and should be sent to the Manager, Book Dept., MACHINERY, National House, 21 West Street, Brighton, 1.**

**CONDITIONS OF SALE AND SUPPLY.—MACHINERY is sold subject to the following conditions:**

**That it shall not, without the written consent of the publishers first given, be lent, resold, hired out or otherwise disposed of by way of trade except at the full retail price of 1s. 3d. and, that it shall not be lent, resold, hired out or otherwise disposed of in a mutilated condition or in an unauthorised cover by way of trade; or affixed to or as part of any publication or advertising literary or pictorial matter whatsoever.**

# Industrial Notes

WOLF ELECTRIC TOOLS, LTD., Hanger Lane, Ealing, London, W.5, have introduced the Grand Prix range of portable electric tools, which comprises drills of $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$ and $\frac{1}{2}$-in. capacity, an orbital sander, a 7-in. disc sander, a $6\frac{1}{2}$-in. circular saw, and a lightw eight screwdriver.

PYE PROCESS HEATING DIVISION, 28 James Street, Cambridge, ask us to state that a fire which occurred recently in Cambridge was in another section of the works and has not upset the production of dielectric or induction heating equipment in any way.

THE GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, and RICHARDSONS, WESTGARTH & Co., LTD., Wallsend, Northumberland, announce that they have decided to pool their resources for the design, development, sales and construction of heavy electricity generating and industrial power plant.

AN AUCTION SALE OF MACHINE TOOLS and miscellaneous stores from the W.D. Storage Depot, South West Stores, Euxton Lane, Chorley, Lancs., will be held at Cheetham Town Hall, Manchester 8, May 29-30. The auctioneers will be J. H. Norris & Son (Dept. N), 9 Albert Square, Manchester, 2.

INTER-ASSOCIATION GOLF COMPETITION.—The golf committees of The Machine Tool Trades Association, The Gauge and Tool Makers' Association, and the British Association of Machine Tool Merchants have selected the Walton Heath Club course in Surrey for this year's inter-association challenge competition on June 20.

FAULKNERS, LTD., Horton Road, Colnbrook, Bucks., makers of drop forgings, and an associate company of Omes, Ltd., Beverley Works, Barnes, London, S.W.13, have recently provided a 123-ft. by 40-ft. extension to their works, to house additional heat-treatment equipment, shot-blasting plant, inspection equipment, and a despatch bay.

RISE IN STOCKS AND WORK IN PROGRESS.—During the fourth quarter of 1960, the value of manufacturers' stocks and work in progress (at 1954 prices), when seasonally adjusted, showed an increase of £151 million. For the full year, the increase, on the same basis, was £461 million, as compared with £56 million in 1959, and £49 million in 1958.

SUNDRIDGE PARK MANAGEMENT CENTRE, Bromley, Kent, is to be opened in June as a residential centre for export studies by leading executives. Organized in consultation with an advisory panel set up by the F.B.I., it is intended to provide intensive training for those responsible for the management of firms engaged in exporting. Further information can be obtained from the Director at the above address.

AN EXHIBITION ON TECHNICAL TRAINING at the Royal Exchange in the City of London will be open from May 29 to June 3 and will be one of the important events of Commonwealth Technical Training Week. It will draw attention to the importance of vocational training and the opportunities presented in industry, commerce, and the public service. There will also be a display provided by the City Livery Companies which will include examples of fine craftsmanship and items of historic interest.

STANLEY HOWARD, LTD., in co-operation with their associates M. HALES & Co., LTD., will stage an exhibition in their showroom at 73 Devon Street, Saltley, Birmingham, 7, from May 29 to June 2. Various machine tools and equipment will be on view, notably a Schwabische Huttenwerke Omniflex tool and die milling machine, a Weisser Goliath heavy duty lathe arranged for automatic threading, and a Microrex type 0 model 75 centreless grinder. Visitors will be welcomed, and those wishing to attend are requested to apply for invitations to enable personal attention to be given.

SLACK & PARR, LTD., Kegworth, Nr. Derby, inform us that for some time they have been developing hydro-pneumatic machine tools and units suitable for drilling, reaming, and tapping, including multi-spindle operations, in the field of light quantity production. Several machines have been built and proved in service, and it is planned to expand activities in this direction. For marketing these machines, as distinct from standard types and drill-heads, Townsend-Coates, Ltd., 167 London Road, Leicester, have been appointed sole agents, and all enquiries should be addressed to them.

ORDERS FOR ENGINEERING AND ELECTRICAL GOODS.—The flow of new orders to the industries producing engineering and electrical goods (Order VI of the Standard Industrial Classification), locomotives and railway track equipment, railway carriages and wagons, heavy commercial vehicles and wheeled tractors, which increased in January, accelerated in February. As in January the whole of the increase was in orders from the home market. With net new orders exceeding deliveries the volume of orders on hand in these engineering and allied industries increased by 3 per cent and for the home market by 4 per cent. It is provisionally estimated that the volume of production in the engineering and electrical goods industries in February was 5 per cent more than in February, 1960. For January and February together, the increase was 3 per cent.

## Correction

In the advertisement for Gaston E. Marbaix, Ltd., Devonshire House, Vicarage Crescent, Battersea, London, S.W.11, on page 65 of MACHINERY for May 3, it was stated incorrectly that the sectional views of a workpiece machined in two stages on a Kummer K20 semi-automatic twin-head precision lathe were shown full size. We are asked to point out that the overall dimensions of the component are $1\frac{9}{16}$ in. by $\frac{11}{16}$ in.

## Machine Tool Share Market

Stock markets were firm and generally cheerful during the period under review, and a high level of business was maintained, with price movements mostly favourable. The gilt-edged section held mainly steady, and, on balance, modest gains were shown among British funds and kindred issues.

The commercial and industrial share sections were buoyant, and displayed strength for the most part, finishing well, with higher prices ruling over a wide range of securities as a result of persistent investment demand and restricted market supplies of stock.

Among machine tool issues, Edgar Allen advanced 2s. 3d. to 46s. 9d.; British Oxygen, 6d. to 36s.; Clarkson (Engineers), 8s. 1½d. to 38s. 9d.; Geo. Cohen, 6d. to 14s. 6d.; John Harper, 1½d. to 8s. 7½d.; Alfred Herbert, 1s. to 76s. 6d.; A. A. Jones & Shipman, 4s. 6d. to 51s. 6d.; Kerry's (Gt Britain), 6d, to 11s. 6d.; Newall Engineering, 9d. to 12s.; Samuel Osborn, 6d. to 60s.; Sanderson Kayser, 1s. 3d. to 38s. 9d.; Ambrose Shardlow, 10s. 9d. to 66s. 3d.; John Shaw & Sons (Wolverhampton), 3d. to 20s. 4½d.; W. E. Sykes "B", 9d. to 33s. 6d.; Wadkin, Ltd., 2s. 6d. to 27s. 6d.; and Thos. W. Ward, 1s. to 80s. 6d.

On the other hand, Asquith Machine Tool lost 6d. at 13s.; Brooke Tool, 3d. at 10s.; Chas. Churchill, 1½d. at 9s. 1½d.; Coventry Gauge & Tool, 10½d. at 32s. 4½d.; Greenwood & Batley, 6d. at 29s.; John Holroyd "B," 1s. at 20s. 6d.; B. & S. Massey, 3d. at 12s.; and Stedall & Co., 3d. at 9s. 6d.

KERRY'S (GT. BRITAIN), LTD.—Final dividend of 10 per cent, making a total distribution of 13¾ per cent for 1960.

## Trade Publications

IMPERIAL ALUMINIUM CO., LTD., P.O. Box 216, Witton, Birmingham 6.—Catalogue—in two volumes—giving details of some of the large number of aluminium and aluminium-alloy extrusions that is available. The first volume, of 130 pages, covers standard extrusions, and includes angles, bars, channels, I-beams, tees, top-hat sections, and Z-sections, also rounds, squares and hexagons. The second volume, of 38 pages, is concerned with selected sections that have been used in road and rail transport vehicles, and in the building industry, for example, for window frames, curtain walling and glazing bars. Gutters, hinges, mouldings, solids and hollows are listed in another section. A dimensioned drawing, either full-size or to scale, is included for each extrusion listed.

| COMPANY | | Denom. | Middle Price |
|---|---|---|---|
| Abwood Machine Tools, Ltd. | Ord. | 1/- | 1/9 |
| Allen (Edgar) & Co., Ltd. | Ord. | £1 | 46/9 |
| " " | 5% Prf. | £1 | 13/9* |
| Arnott & Harrison, Ltd. | Ord. | 4/- | 14/6 |
| Asquith Machine Tool Corp., Ltd. | Ord. | 5/- | 13/- |
| " " " | 6% Cum. Prf. | £1 | 16/6 |
| Birmingham Small Arms Co., Ltd. | Ord. | 10/- | 86/- |
| " " " | 5% Cum. "A" Prf. | £1 | 14/6 |
| " " " | 6% Cum. "B" Prf. | £1 | 17/- |
| " " " | 4% 1st Mort. Deb. | Stk. | 92 |
| British Oxygen Co., Ltd. | Ord. | 5/- | 36/- |
| " " | 6% Cum. Prf. | £1 | 20/6 |
| Brooke Tool Manufacturing Co., Ltd. | Ord. | 5/- | 10/- |
| Broom & Wade, Ltd. | Ord. | 5/- | 28/3 |
| " " | 6% Cum. Prf. | £1 | 16/6 |
| Brown (David) Corporation, Ltd. | 5½% Cum. Prf. | £1 | 16/- |
| Buck & Hickman, Ltd. | 6% Cum. Prf. | £1 | 17/- |
| Butler Machine Tool Co., Ltd. | Ord. | 5/- | 16/10½ |
| " " | 5% Cum. Prf. | £1 | 14/3 |
| Churchill (Charles) & Co., Ltd. | Ord. | 2/- | 9/1½ |
| " " " | 6% Cum. Prf. | £1 | 25/4½‡ |
| Clarkson (Engrs.), Ltd. | Ord. | 5/- | 38/9 |
| Cohen (George), 600 Group, Ltd. | Ord. | 5/- | 14/6 |
| " " | 4½% Cum. Prf. | £1 | 12/6 |
| Coventry Gauge & Tool Co., Ltd. | Ord. | 10/- | 32/4½ |
| " " " | 5% Cum. Red. Prf. | £1 | 16/3 |
| Craven Bros. (Manchester), Ltd. | Ord. | 5/- | 9/10½xd |
| Elliott (B.) & Co., Ltd. | Ord. | 1/- | 3/7½ |
| " " | 4½% Red. Cum. Prf. | £1 | 12/- |
| Expert Tool & Case Hardening Co., Ltd. | Ord. | 2/- | 2/7½ |
| Firth Brown Tools, Ltd. | 4% Cum. Prf. | £1 | 11/- |
| Greenwood & Batley, Ltd. | Ord. | 10/- | 29/- |
| Harper (John) & Co., Ltd. | Ord. | 5/- | 8/7½ |
| " " " | 4½% Red. Cum. Prf. | £1 | 12/- |
| Herbert (Alfred), Ltd. | Ord. | £1 | 76/6 |
| Holroyd (John) & Co., Ltd. | "A" Ord. | 5/- | 22/6 |
| " " | "B" Ord. | 5/- | 20/6 |
| Jones (A. A.) & Shipman, Ltd. | Ord. | 5/- | 51/6 |
| " " " | 7% Cum. Prf. | 5/- | 4/9 |
| Kearney & Trecker-C.V.A., Ltd. | 5½% Red. Cum. Prf. | £1 | 11/- |
| " " " | Prefd. Ord. | £1 | 13/9 |
| Kearns (H. W.) & Co., Ltd. | Ord. | 5/- | 24/3 |
| Kerry's (Gt. Britain), Ltd. | Ord. | 5/- | 11/6 |
| Macreadys Metal Co., Ltd. | Ord. | 5/- | 17/6 |
| Martin Bros. (Machinery), Ltd. | Ord. | 2/- | 2/6 |
| Massey (B. & S.), Ltd. | Ord. | 5/- | 12/- |
| Newall Engineering Co., Ltd. | Ord. | 2/- | 12/- |
| Newman Industries, Ltd. | Ord. | 2/- | 6/- |
| " " | 6% Prf. Ord. | 5/- | 5/- |
| Noble & Lund, Ltd. | Ord. | 2/- | 5/6 |
| Norton, W. E. (Holdings), Ltd. | Ord. | 2/- | 8/- |
| Osborn (Samuel) & Co., Ltd. | Ord. | 5/- | 60/-xd |
| " " " | 5½% Cum. Prf. | £1 | 23/6 |
| Pratt (F.) & Co., Ltd. | Ord. | 5/- | 16/10½ |
| Sanderson Kayser, Ltd. | Ord. | 10/- | 38/9 |
| " " | 6½% Cum. Prf. | £1 | 17/- |
| Scottish Machine Tool Corporation, Ltd. | Ord. | 4/- | 11/3 |
| Shardlow (Ambrose) & Co., Ltd. | Ord. | £1 | 66/3 |
| Shaw (John) & Sons, Wolverhampton, Ltd. | Ord. | 5/- | 20/4½ |
| Sheffield Twist Drill & Steel Co., Ltd. | Ord. | 4/- | 19/6 |
| " " " | 5% Cum. Prf. | £1 | 14/3 |
| Stedall & Co., Ltd. | Ord. | 5/- | 9/6 |
| Sykes (W. E.), Ltd. | "B" non-voting Ord. | 10/- | 33/6 |
| Tap & Die Corporation, Ltd. | Ord. | 5/- | 19/3 |
| " " " | 4½% Deb. 1961-1977 | Stk. | 82½ |
| Wadkin, Ltd. | Ord. | 10/- | 27/6 |
| Ward (Thos. W.), Ltd. | Ord. | £1 | 80/6 |
| " " | 5% Cum. 1st Pref. | £1 | 14/- |
| " " | 5% Cum. 2nd Pref. | £1 | 22/6 |
| Willson Lathes, Ltd. | Ord. | 1/- | 3/4½ |

The Middle Prices given in the list are in several cases nominal prices only and not actual dealing prices. Every effort is made to ensure accuracy, but no liability can be accepted for any error. * Sheffield price. ‡ Birmingham price.

# BRITISH MACHINE TOOL

## Exports of New Machine Tools

| Countries | Bar and Chucking Automatics | | Vertical Boring Machines | | Other Boring Machines | | Drilling Machines | | Gear-cutting Machines | | Grinding, Lapping and Honing Machines | | Capstan and Turret Lathes | | Other Lathes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ |
| *Commonwealth* | | | | | | | | | | | | | | | | |
| South Africa | 25 (1) | 4,388 | — | — | — | — | 401 (30) | 8,292 | — | — | 2 (2) | 236 | 618 (8) | 15,539 | 389 (19) | 14,484 |
| India | — | — | 2,795 (4) | 141,105 | 428 (9) | 22,941 | 180 (41) | 5,262 | 15 (1) | 1,391 | 1,547 (34) | 41,494 | 1,281 (23) | 57,104 | 911 (6) | 34,432 |
| Pakistan | — | — | — | — | 17 (2) | 899 | 18 (2) | 1,706 | — | — | 43 (11) | 1,463 | — | — | 30 (2) | 1,764 |
| Australia | 125 (3) | 6,190 | — | — | 1,202 (7) | 31,952 | 1,011 (26) | 25,420 | — | — | 424 (16) | 19,474 | 1,403 (32) | 49,901 | 1,022 (75) | 40,322 |
| New Zealand | — | — | — | — | — | — | 216 (14) | 4,419 | — | — | 453 (56) | 16,100 | 246 (6) | 11,993 | 500 (12) | 18,257 |
| Canada | — | — | 140 (1) | 3,281 | 1 (1) | 51 | 299 (11) | 6,143 | — | — | 125 (30) | 5,498 | 435 (3) | 18,850 | 1,371 (19) | 40,250 |
| Miscellaneous | — | — | 585 (1) | 6,825 | 177 (2) | 3,304 | 497 (45) | 14,149 | — | — | 153 (20) | 5,872 | 265 (14) | 9,408 | 2,365 (34) | 67,093 |
| *Foreign* | | | | | | | | | | | | | | | | |
| Soviet Union | — | — | — | — | — | — | — | — | 271 (9) | 25,916 | 465 (8) | 46,145 | — | — | 684 (8) | 23,460 |
| Sweden | — | — | — | — | — | — | 92 (4) | 3,167 | — | — | 71 (2) | 4,372 | 517 (21) | 23,288 | 102 (4) | 2,480 |
| Norway | — | — | — | — | — | — | 46 (2) | 1,784 | — | — | 3 (1) | 160 | 40 (2) | 1,787 | 125 (14) | 4,781 |
| Denmark | — | — | — | — | — | — | 134 (2) | 2,986 | — | — | — | — | 173 (5) | 7,434 | 49 (3) | 1,353 |
| Western Germany | — | — | — | — | — | — | 105 (3) | 1,887 | 85 (13) | 5,211 | 262 (8) | 39,555 | 25 (2) | 3,568 | 415 (33) | 16,449 |
| Netherlands | — | — | — | — | 260 (2) | 5,808 | 118 (43) | 3,662 | — | — | 31 (2) | 1,207 | 439 (14) | 24,734 | 31 (2) | 1,232 |
| Belgium | — | — | — | — | — | — | 191 (3) | 4,026 | 44 (1) | 800 | 33 (4) | 881 | 250 (5) | 11,251 | 57 (8) | 2,000 |
| France | 338 (3) | 21,020 | — | — | 230 (3) | 11,410 | 59 (3) | 1,958 | 400 (1) | 15,313 | 252 (14) | 15,481 | 310 (4) | 12,368 | 171 (2) | 11,055 |
| Switzerland | — | — | — | — | — | — | 40 (1) | 1,400 | — | — | 108 (5) | 6,075 | 187 (5) | 12,060 | 146 (59) | 5,282 |
| Spain | — | — | — | — | — | — | — | — | 38 (2) | 2,078 | 149 (4) | 5,657 | 213 (2) | 12,467 | — | — |
| Italy | 546 (4) | 37,442 | 9 (1) | 700 | — | — | 34 (2) | 1,683 | 19 (2) | 781 | 78 (5) | 5,549 | — | — | 11 (6) | 447 |
| U.S. America | — | — | 307 (1) | 6,218 | — | — | 523 (9) | 13,509 | — | — | 508 (28) | 23,347 | 227 (8) | 11,292 | 489 (25) | 16,512 |
| Miscellaneous | 23 (3) | 2,143 | 388 (3) | 13,580 | 1,368 (3) | 55,130 | 786 (40) | 22,907 | 797 (11) | 58,554 | 1,101 (71) | 46,321 | 571 (10) | 29,061 | 1,598 (105) | 57,791 |
| Total | 1,057 (14) | 71,183 | 4,224 (11) | 171,709 | 3,683 (29) | 131,495 | 4,750 (281) | 124,360 | 1,669 (40) | 110,044 | 5,808 (321) | 284,887 | 7,200 (164) | 312,105 | 10,466 (436) | 359,444 |

Total exports of reconditioned machine tools: Quantity: No., 100; Weight, 4,775 cwt.; Value, £37,354.
Total exports of imported machine tools: Quantity: Weight, 1,667 cwt.; Value, £36,042.

## Imports of New Machine Tools

| Country of Origin | Bar and Chucking Automatics | | Vertical Boring Machines | | Other Boring Machines | | Drilling Machines | | Gear-cutting Machines | | Grinding, Lapping and Honing Machines | | Capstan and Turret Lathes | | Other Lathes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ |
| Sweden | — | — | 20 (3) | 386 | — | — | 74 (6) | 1,700 | — | — | 1,095 (17) | 66,533 | 275 (1) | 11,696 | — | — |
| Western Germany | 165 (4) | 11,023 | — | — | 1,447 (6) | 37,671 | 74 (11) | 9,156 | 361 (5) | 28,409 | 3,490 (104) | 135,998 | 728 (23) | 39,632 | 773 (48) | 45,168 |
| France | — | — | — | — | 38 (3) | 2,743 | 70 (3) | 2,820 | 21 (1) | 1,353 | 35 (8) | 4,131 | — | — | 40 (1) | 1,903 |
| Switzerland | 327 (22) | 38,308 | 105 (2) | 9,441 | 17 (1) | 1,285 | 17 (5) | 1,401 | 52 (5) | 17,121 | 350 (49) | 34,235 | 455 (13) | 39,059 | 736 (41) | 54,036 |
| U.S. America | 510 (4) | 33,002 | 14 (2) | 1,279 | 41 (1) | 3,050 | 57 (5) | 8,033 | 2,902 (15) | 194,301 | 2,029 (44) | 174,062 | 377 (1) | 32,675 | 752 (57) | 49,812 |
| Miscellaneous | — | — | 58 (2) | 1,514 | 238 (5) | 8,654 | 429 (11) | 14,168 | 135 (3) | 9,772 | 783 (52) | 36,447 | 11 (1) | 539 | 627 (20) | 19,439 |
| Total | 1,002 (30) | 82,333 | 197 (9) | 12,620 | 1,781 (16) | 53,403 | 721 (41) | 37,278 | 3,471 (29) | 250,956 | 7,782 (274) | 451,406 | 1,846 (39) | 123,601 | 2,928 (167) | 170,358 |

Total imports of reconditioned machine tools: Quantity: No., 58; Weight, 2,757 cwt.; Value, £55,041.

# IMPORTS AND EXPORTS (Classified)

## and Parts during January, 1961

| Milling Machines | | Presses | | Sheet Metal-working Machines | | Sawing Machines | | Screwing and Threading Machines | | Planing, Shaping and Slotting Machines | | Unit Transfer Machines and Heads | | Other Machines | | Machine Tool Parts* | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. | Value £ | Quantity. Cwt. and No. | Value £ |
| 97 (2) | 5,475 | 1,147 (16) | 13,108 | 662 (18) | 36,354 | 110 (5) | 2,892 | 55 (4) | 3,910 | — | — | 5 (1) | 253 | 646 (7) | 17,605 | 947 | 23,915 | 5,104 (113) | 146,451 |
| 401 (5) | 9,725 | 1,816 (8) | 38,204 | 595 (4) | 21,993 | 190 (2) | 5,621 | — | — | 415 (10) | 16,100 | — | — | 1,347 (37) | 59,361 | 5,263 | 146,036 | 17,184 (184) | 600,769 |
| 25 (1) | 1,003 | 14 (1) | 229 | 43 (2) | 1,785 | — | — | — | — | 33 (1) | 720 | — | — | 209 (4) | 6,073 | 42 | 3,473 | 474 (26) | 19,115 |
| 1,173 (39) | 55,846 | 967 (7) | 19,520 | 163 (5) | 6,503 | 66 (9) | 1,860 | 151 (3) | 9,795 | 306 (29) | 10,280 | — | — | 2,115 (50) | 67,034 | 1,999 | 109,988 | 12,127 (301) | 454,085 |
| 167 (6) | 8,355 | 396 (12) | 7,564 | 78 (5) | 1,505 | 112 (9) | 3,189 | — | — | 578 (3) | 11,973 | — | — | 137 (20) | 3,494 | 63 | 5,216 | 2,946 (143) | 92,065 |
| 788 (13) | 40,456 | — | — | 410 (2) | 8,506 | 27 (4) | 752 | 32 (1) | 2,716 | 42 (2) | 1,121 | — | — | 13 (3) | 670 | 144 | 8,793 | 3,827 (90) | 137,087 |
| 501 (9) | 17,841 | 445 (16) | 11,856 | 389 (15) | 12,789 | 19 (3) | 843 | 26 (5) | 1,172 | 129 (4) | 4,240 | — | — | 59 (5) | 1,413 | 320 | 17,447 | 5,930 (173) | 174,252 |
| — | — | — | — | 171 (3) | 15,824 | — | — | — | — | — | — | — | — | — | — | — | — | 1,591 (28) | 111,345 |
| 290 (2) | 10,988 | — | — | — | — | — | — | 126 (2) | 1,623 | — | — | — | — | 402 (5) | 12,018 | 122 | 13,405 | 1,722 (40) | 71,341 |
| 20 (1) | 1,116 | 26 (8) | 1,005 | — | — | 1 (1) | 47 | — | — | — | — | — | — | 54 (1) | 2,677 | 26 | 1,776 | 341 (30) | 15,133 |
| — | — | — | — | 53 (2) | 1,897 | — | — | 34 (2) | 3,091 | — | — | — | — | 212 (5) | 16,065 | 37 | 3,912 | 692 (19) | 36,738 |
| 488 (6) | 31,654 | — | — | 177 (2) | 12,950 | 62 (3) | 2,475 | 315 (7) | 16,070 | 400 (1) | 5,350 | — | — | 56 (3) | 3,040 | 172 | 10,597 | 2,562 (81) | 148,806 |
| 47 (5) | 1,028 | 80 (3) | 5,281 | — | — | — | — | 187 (7) | 8,061 | 29 (1) | 566 | — | — | 754 (23) | 31,924 | 164 | 12,689 | 2,140 (102) | 96,192 |
| — | — | 300 (1) | 5,916 | 36 (1) | 1,047 | — | — | — | — | 50 (1) | 1,349 | — | — | 166 (3) | 7,028 | 62 | 2,618 | 1,189 (27) | 36,916 |
| 242 (3) | 8,119 | 5 (1) | 127 | 215 (3) | 12,894 | 27 (1) | 362 | 193 (3) | 20,331 | 666 (4) | 32,646 | — | — | 880 (10) | 44,197 | 142 | 13,821 | 4,130 (55) | 221,102 |
| 97 (7) | 2,432 | — | — | — | — | — | — | 40 (1) | 3,701 | — | — | — | — | 2 (2) | 121 | 209 | 7,491 | 829 (80) | 38,562 |
| 322 (3) | 13,744 | 1 (1) | 65 | 824 (2) | 23,267 | — | — | 60 (1) | 3,787 | — | — | — | — | 69 (3) | 16,974 | 36 | 2,371 | 1,712 (18) | 80,410 |
| 827 (5) | 33,077 | 2,551 (8) | 54,797 | 100 (2) | 5,441 | — | — | 32 (1) | 3,359 | — | — | — | — | 215 (7) | 9,476 | 304 | 20,783 | 4,726 (43) | 173,535 |
| 33 (2) | 1,177 | 1,426 (9) | 30,793 | — | — | — | — | 97 (3) | 6,590 | 62 (1) | 2,280 | — | — | 39 (4) | 2,608 | 305 | 21,392 | 4,016 (90) | 135,718 |
| 344 (12) | 16,323 | 3,350 (18) | 58,520 | 1,235 (54) | 28,453 | 43 (7) | 1,249 | 287 (9) | 26,865 | 494 (27) | 15,533 | — | — | 1,834 (42) | 66,962 | 686 | 41,277 | 14,905 (415) | 540,669 |
| 5,862 (121) | 258,359 | 12,524 (109) | 246,985 | 5,151 (120) | 191,208 | 657 (44) | 19,290 | 1,635 (49) | 111,071 | 3,204 (84) | 102,158 | 5 (1) | 253 | 9,209 (234) | 368,740 | 11,043 | 467,000 | 88,147 (2,058) | 3,330,291 |

Figures in parentheses denote number of machines. * Not including machine tool cutting parts.

## and Parts during January, 1961

| Milling Machines | | Presses | | Sheet Metal-working Machines | | Sawing Machines | | Screwing and Threading Machines | | Planing, Shaping and Slotting Machines | | Unit Transfer Machines and Heads | | Other Machines | | Machine Tool Parts* | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. | Value £ | Quantity. Cwt. and No. | Value £ |
| 117 (3) | 5,784 | — | — | 122 (5) | 3,761 | — | — | 14 (1) | 766 | — | — | — | — | 13 (3) | 743 | 71 | 5,536 | 1,801 (39) | 96,905 |
| 836 (25) | 43,815 | 2,623 (33) | 70,791 | 476 (17) | 14,846 | 621 (46) | 17,082 | 34 (11) | 4,094 | 2,017 (7) | 61,378 | — | — | 2,091 (66) | 91,483 | 415 | 40,883 | 16,151 (406) | 651,429 |
| 549 (10) | 28,905 | 133 (4) | 2,192 | 345 (15) | 11,604 | 4 (1) | 274 | — | — | — | — | — | — | 197 (9) | 13,734 | 114 | 11,720 | 1,546 (55) | 81,379 |
| 805 (12) | 37,416 | 504 (6) | 23,022 | 624 (7) | 13,207 | 15 (1) | 1,041 | 55 (20) | 4,187 | — | — | 67 (1) | 7,449 | 177 (8) | 19,369 | 128 | 30,686 | 4,434 (193) | 331,263 |
| 609 (26) | 61,033 | 347 (6) | 14,100 | 243 (22) | 29,709 | 25 (2) | 1,819 | 435 (29) | 24,064 | 57 (7) | 11,915 | — | — | 1,182 (34) | 88,796 | 2,806 | 197,572 | 12,386 (255) | 925,222 |
| 1,746 (38) | 55,448 | 1,193 (20) | 16,500 | 585 (13) | 13,200 | 277 (36) | 8,086 | 114 (3) | 8,767 | 335 (6) | 6,791 | — | — | 37 (11) | 3,510 | 601 | 24,506 | 7,169 (221) | 227,341 |
| 4,662 (114) | 232,401 | 4,800 (69) | 126,605 | 2,395 (79) | 86,327 | 942 (86) | 28,302 | 652 (64) | 41,878 | 2,409 (20) | 80,084 | 67 (1) | 7,449 | 3,697 (131) | 217,635 | 4,135 | 310,903 | 43,487 (1,169) | 2,313,539 |

Figures in parentheses denote number of machines. * Not including machine tool cutting parts.

# PRICES OF MATERIALS

All prices per ton except where otherwise stated.

## Pig Iron

### Foundry and Forge No. 3, Class 2

| | |
|---|---|
| Middlesbrough (10 tons or over) | £21 17 0 |
| Birmingham (10 tons or over) | £21 9 3 |

### Phos. Over 0·1 up to 0·4%

| | |
|---|---|
| Birmingham (6 ton lots) | £23 5 0 |
| Grangemouth (6 ton lots) | £23 10 0 |

### Hæmatite

English No. 1 (10 tons or over)

| | |
|---|---|
| N.E. Coast (made in N.E.) | £23 19 0 |
| Scotland | £24 5 6 |
| Sheffield | £25 9 0 |
| Birmingham | £25 13 0 |
| Welsh 10 tons or over | £23 19 0 |

## Steel Products

| | |
|---|---|
| Medium plates (50 tons and over) | £43 16 6 |
| Mild steel plates, ordinary (50 tons and over) | £40 7 0 |
| Boiler plates (50 tons and over) | £42 17 0 |
| Flat bars, 5 in. wide and under (50 tons or over) | £39 1 0 |
| Round bars, under 3 in. (50 tons or over) | £39 1 0 |
| Billets, rolling quality, soft U.T. (100 tons or over) | £31 15 6 |

## Phosphor Bronze

| | |
|---|---|
| Ingots (2B8) (A.I.D.) d/d | £316 0 0 |

## Copper

| | |
|---|---|
| Cash (mean) | £239 10 0 |
| Cold rolled and hot rolled sheets 4 ft. by 2 ft. by 10 SWG | £311 5 0—311 10 0 |
| Rods, $\frac{5}{16}$ in. to $\frac{3}{4}$ in. diam. | £328 10 0 |
| Tubes, $1\frac{1}{4}$ in. bore by 10 SWG, ton lots, per lb. | 3s. 2½d. |
| Wire rod, black, hot-rolled ($\frac{1}{4}$–$\frac{5}{16}$ in.), English | £255 2 6 |

## Zinc

| | |
|---|---|
| Refined, minimum 98 per cent purity, current month (mean) | £83 8 9 |

## Brass

| | |
|---|---|
| Tubes, solid drawn, per lb. | 1s. 10½d. |
| Strip 63/37, 6in. by 10 SWG coils, ton lots | £260 15 0—£263 15 0 |
| Rods, ½-3 in. diam. (59 per cent copper) | 2s. 1d. |

## Yellow Metal

| | |
|---|---|
| Condenser plates, per ton | £192 0 0 |
| Rods, per lb. | 2s. 2d. |

## Aluminium

| | |
|---|---|
| Ingots, min. 99·5 per cent Canadian d/d | £186 0 0 |

## Tinplates

| | |
|---|---|
| *U.K. Home trade: Cold reduced, f.o.r. makers works (15-50 tons) | £3 6 8 |
| U.K. Export: Hot rolled basis, f.o.r. works port | 73s. 6d.—76s. 0d. |
| Cold reduced basis, f.o.r. works port | 73s. 6d.—76s. 0d. |

## Gunmetal

| | |
|---|---|
| Ingots, B.S. 1400 L.G.2, delivered | £226 0 0 |

* Official maximum price, after allowing for adjustments for increase in price of tin.

## MAKERS' PRICES

### Hexagon Steel Bars[1]

| | |
|---|---|
| Sizes in inches from 1 in. up to 2·21 and 2·41 a/f ex works, 2 tons basis | £42 17 0 |
| Free cutting black | £47 6 6 |

### Reeled Steel Bars[1]

| | |
|---|---|
| Single-reeled, 1½ in. upwards, f.o.t. works (+ usual extra for sizes) | £43 9 6 |
| Free cutting | £47 19 0 |

### Precision-ground Mild Steel[2]

| | |
|---|---|
| 1-in. diam. ± 0·00025-in. 4-ton lots, per cwt. | 124s. 6d. |

### Bright Ground Stainless Steel Bars[3]

| | |
|---|---|
| EN56AM (martensitic, free cutting) | £304 10 0 |
| EN58AM (austenitic free cutting) | £377 10 0 |

Prices are basic, subject to extras.

### High-speed Steel

Black random length bar. All prices basic, per lb., subject to extras:

| | |
|---|---|
| Molybdenum "66" | 6s. 5d. |
| Molybdenum "46" | 6s. 3d. |
| 14 per cent tungsten | 6s. 11d. |
| 16 per cent tungsten | 7s. 4d. |
| 18 per cent tungsten | 7s. 9d. |
| 22 per cent tungsten | 9s. 2d. |
| 5 per cent cobalt | 10s. 10d. |
| 4·75/5·25 molybdenum + 6·0/6·75 tungsten + 1·75/2·05 vanadium per cent (5-6-2) | 6s. 7d. |

### Precision-ground, High-speed Free-turning Brass Rod[2]

| | |
|---|---|
| ⅜-in. diam. ±0·00025-in., 2 ton lots, per lb. | 2s. 7⅜d. |

### Grey Iron Rod

Die Cast[4] in random lengths 18 in. to 26 in. rough machined ⅛-in. above listed size. Extra for definite lengths. Discounts for orders over £150.

| | Per cwt. net. Mark I | Mark III |
|---|---|---|
| ¾ or ⅞ in. | 260s. 3d. | 338s. 3d. |
| 1 or 1⅛ in. | 208s. 4d. | 267s. 3d. |
| 1¼ to 1½ in. | 146s. 3d. | 181s. 7d. |
| 1⅝ to 2 in. | 112s. 7d. | 133s. 6d. |
| 2¼ to 3½ in. | 97s. 1d. | 112s. 9d. |
| 3⅝ to 12 in. | 91s. 9d. | 105s. 3d. |

### Continuous Cast

10-ft. lengths, centreless machined 1 to 3-in. diam. + 0·010 to 0·020 in., prices as quoted for die cast bar[4]

| | | |
|---|---|---|
| centreless ground 1 or 1⅛ in. +0·010 in. Extra | | 208s. 4d. |
| for hardenable alloy iron[5] | 1¼ to 1½ in. | 146s. 3d. |
| | 1⅝in. to 2 in. | 112s. 7d. |
| Per cwt. net | 2¼ to 3½ in. | 97s. 1d. |

### Stellite[6]

#### Welding Rods, plain

| | |
|---|---|
| ¼ in. diam., per lb. | 30s. 0d. |

#### Toolbits

| | |
|---|---|
| ¼ in. sq. × 4 in., each | 22s. 3d. |

[1] Colvilles, Ltd., Glasgow, and 17 Grosvenor Street, London, W.1. [2] Pratt, Levick & Co., Ltd., Chester. [3] Spartan Steel & Alloys, Ltd., St. Stephens Street, Birmingham, 6. [4] Sheepbridge Alloy Castings, Ltd., Sutton-in-Ashfield. [5] "Flocast," Harold Andrews Sheepbridge, Ltd., Halesowen. [6] Deloro Stellite, Ltd., Highlands Road, Shirley, Solihull.

## BASIC PRICES FROM LONDON STOCK[6]

### Free Cutting Steel

| | |
|---|---|
| Bright cold drawn: (Usaspead) over 1 to 2 in. | £59 4 6 |
| Lead bearing (Usaled) | £63 11 0 |
| Precision ground, 1¾ in. | £84 14 6 |

### Bright Drawn

| | |
|---|---|
| M.S. bars (M.M.C.) over 1½ to 2 in. | £56 10 0 |
| Square edge flats (Usaflat) | £73 6 6 |
| M.S. angles (Usaspead) | £100 6 6 |
| Case hardening (EN) (Usacase) over 1½ to 2 in. | £62 10 0 |
| M.S. bars (EN3B) (Usamild) over 1½ to 2 in. | £58 16 6 |
| Carbon manganese semi-free cutting case hardening (EN202) (Usaspead 202) over 1½ to 2 in. | £71 5 0 |
| 35/45 ton tensile (EN6) (Usen) over 1 to 1½ in. | £67 3 0 |
| 0·4 carbon normalized (Usaspead "40") over 1½ to 2 in. | £69 5 0 |
| 0·45 carbon normalized EN9 (Usaspead 55) | £69 15 0 |
| Carbon manganese steel to Specification EN16T (Usaspead 5565), per ton | £126 17 0 |

### Ground Flat Stock

18-, 24-, and 36-in. lengths (Usaspeed). List prices plus 10 per cent, less 5 per cent.

### Oil Hardening Cast Steel

| | |
|---|---|
| Non-shrink (Usaspead N.S.O.H.), ¾ in. to 2½ in., per lb. | 1s. 11d. |
| Non-distorting heavy duty (Usaspead H.C.H.C.), ¾ in. to 2¾ in., per lb. | 4s. 2d. |

### Silver Steel

(0·194-in. to 1½-in.)

| | |
|---|---|
| Genuine Stubs quality, per lb. | 4s. 10d. less 27½% |
| M.M.C. quality, per lb. | 2s. 8d. + 6½% |
| Boxes of 16 assorted sizes, $\frac{1}{32}$ in. to ⅜ in. diam. | 7s. 6d. |

### Stainless Steel

| | |
|---|---|
| KE40AM (free cutting), per lb. | 3s. 8d* |

### Glacier Machined Bronze Bars

| | |
|---|---|
| Phosphor bronze (2B8) / Lead bronze | Prices on application |

### High-speed Steel

18 per cent tungsten. Prices on application.

Toolholder bits:

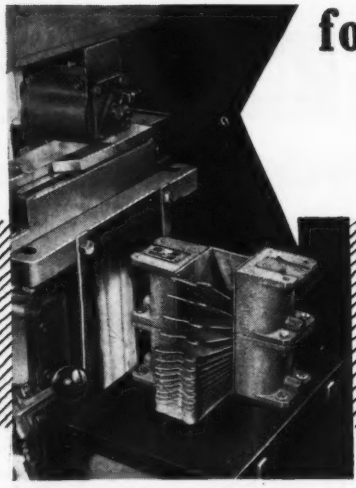
| | |
|---|---|
| Usaspead "Super" / "Supreme" / Cobalt 10 | List price |

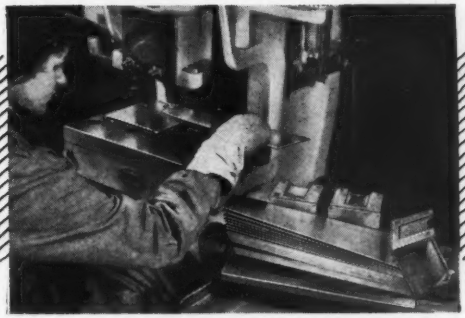
### Shimstock

| | |
|---|---|
| Steel assorted, per tin | 3s. 6d. |
| Brass " " | 7s. 3d. |

[6] Macready's Metal Co., Ltd., Pentonville Road, N.1. Subject to confirmation by London Office. Delivered free by van in London area.

# for the speedier handling of ferrous sheets





Eclipse

**MAGNETIC FLOATERS**

Handling time can be reduced by presenting ferrous parts separated one from another. "Eclipse" Magnetic Floaters will part them—clean or greased. Available in two sizes.

Literature, demonstration and supplies from your usual 'Eclipse' Magnetic Tool distributor

Made in Sheffield by James Neill & Co. (Sheffield) Ltd.

PM 159

# *Screwing bolts or pipes?*

***DO IT FASTER, MORE ACCURATELY & MORE ECONOMICALLY ON THE***

# HEAP'S

PATENT

**2½in. AUTOMATIC BOLT & PIPE SCREWING MACHINE**

With dies opening automatically when any predetermined length has been threaded; and with automatic closing device, the latest HEAP screwing machine means faster and better production on all work within its capacity. Adjustable High Speed Steel TANGENTIAL dies can be supplied for all thread forms.

Maximum capacity for bolts ... ... ... ... 2½in.
Maximum capacity for pipes: parallel or taper ... 2in.

*Catalogue free on request.*

**JOSHUA HEAP AND CO. LTD.**

**ASHTON-UNDER-LYNE, ENGLAND**

# ARNO

No. 2S

## UNIVERSAL MILLER

. . . with dial changes, backlash eliminator and rapid traverses. One of the range of seven ARNO Universals from 2 h.p. to 25 h.p.

*Illustration shows ram type universal milling head as optional extra.*

W.S. of table.....59in. by 12¼in.
Power Traverses.....43¾in. longt.
12in. cross. 18¼in. vertical
Feed (12).....¼in.—23¾in.
Rapid traverses ...94¼in. per min.
Spindle taper.....No. 50
Speeds (12).....30—1,200 rpm.
Power .....9½ h.p.
Weight ..... 48 cwt.

**Ram type Universal Milling Head**
Speeds (12).....25—1,500 rpm.
Motor ..... 3 h.p.
Spindle nose to table.....24in. max.
Spindle centre to column 4in. min—36in. max.
Head swivels...2 planes, both 180°.

*For ARNO Sales and Service consult :—*

**PIDGEN BROS LIMITED**

**HELMET ROW, OLD STREET, LONDON, E.C.1. Telephone: CLErkenwell 6481**

# NUMBERING ON METAL

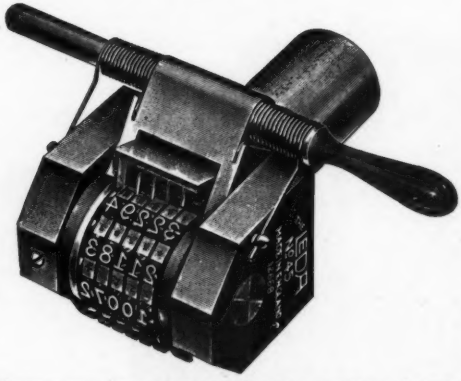
## 'LEDA'

### NUMBERING MACHINES

***NUMBERING HEAD FOR METAL***

Consecutive and Repeat Actions

**Power, Fly, Hand or Pneumatic Presses and similar equipment**

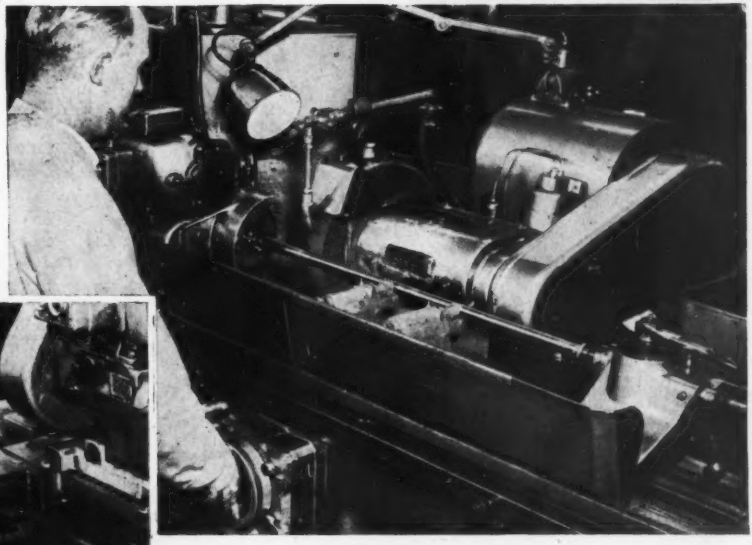


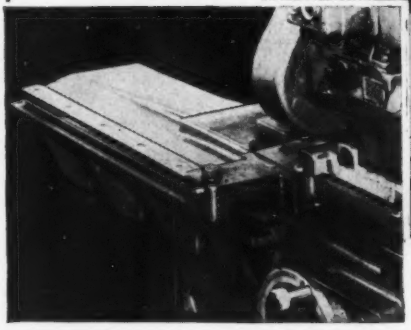
It is used for marking Aircraft components with reference numbers, part and drawing numbers, date of manufacture, inspection mark, for marking Shells, Bombs, Cartridges, Engine Parts, Motor Car, Motor Cycle, Cycle, Wireless, Electrical, Clock, Watch and other instrument parts in all materials. Checks. Labels, Name Plates, Pigeon Rings, in fact any article which requires an identification mark. Mass produced articles can only be satisfactorily identified by individual reference numbers.

**W. LETHABY & Co. Ltd.**
**LEDA HOUSE, 124-132, CLERKENWELL ROAD, LONDON, E.C.1**
Telephone: TERminus 1104 (5 lines)

# BANG ON TARGET!

**GRINDING SHOT-GUN TUBES** for **Webley SPORTING GUNS**





One of the essentials of a good sporting gun is the tube or barrel which calls for very careful precision production methods. A most important operation is the grinding of the outside diameter which due to the length and shape of the barrel plus the thinness of the walls proves a very delicate grinding operation. For this purpose a battery of Jones-Shipman Model 1305 10in. by 40in. Plain Cylindrical grinders are used, all fitted with a special 'following' attachment as illustrated in the inset illustration.

J & S

Webley & Scott Ltd., of Handsworth, Birmingham, need little introduction. They have a tradition built up over the past 170 years as manufacturers of sporting guns of the highest precision and quality. Thousands are in use in the hands of sportsmen throughout the world.

**A. A. JONES & SHIPMAN LTD.**

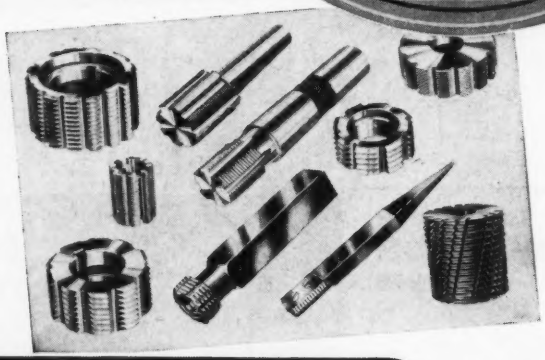
**JONES - SHIPMAN**

LEICESTER. Telephone 823222 *London Office, 50-52 Great Peter Street, London, S.W.1.* *Telephone Abbey 5908-9*

*When answering advertisements kindly mention MACHINERY.*

# *For* THREAD MILLING HOBS, CHASERS and CRUSHERS... *consult* DOWDING

We are specialists—and these tools are made in our own Works from tungsten steel of the highest grade, carefully heat treated and inspected. Pitch and form are of guaranteed accuracy. Our Swiss Reishauer grinders have increased our capacity, particularly for 'specials', and we hold a large stock of standard sizes for every make of machine.



**DOWDING & DOLL LTD**
346 KENSINGTON HIGH STREET, LONDON, W.14
*Tel:* WESTERN 8077 (8 lines) *Telex:* 23182 *Grams:* ACCURATOOL LONDON TELEX

★ *Ask us to send our detailed catalogue M/121*

# FELT

## FOR ALL PURPOSES

SHEETS, STRIPS, PADS, WASHERS, OIL SEALS,

JOINTINGS, ETC., PIPE LAGGING FELT.

***FELT POLISHING BOBS***

## HARDY & HANSON LTD.

**SUMMIT WORKS · LONGLANDS ROAD · DEWSBURY**

**Telephone : 2353** **Telegrams : SUMMIT, DEWSBURY**

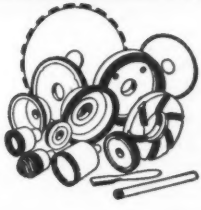
May

fo

MAN

DIST

# for perfection in diamond wheels



MANUFACTURED BY IMPREGNATED DIAMOND PRODUCTS LTD · GLOUCESTER

DISTRIBUTED BY UNIVERSAL GRINDING WHEEL COMPANY LIMITED · STAFFORD

*When answering advertisements kindly mention MACHINERY.*

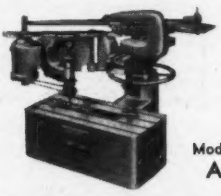
N

TAYLOR-HOBSON

*Machines of Proved*

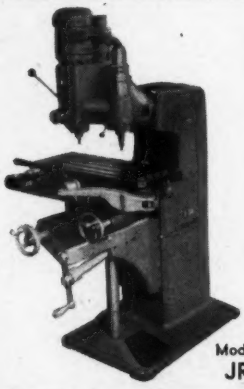
***PERFORMANCE***

for ENGRAVING, COPYING, DIEMAKING
PROFILING AND ROUTING

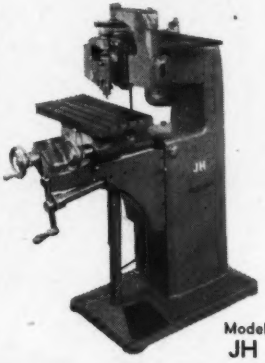


Model A

Model D



Model JR

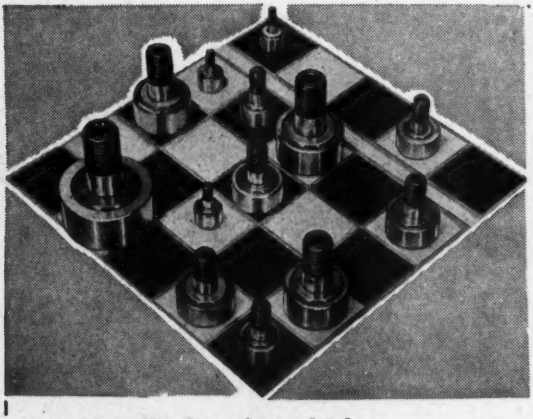


Model JH

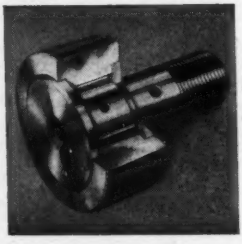
A Division of RANK PRECISION INDUSTRIES LTD.

**TAYLOR, TAYLOR & HOBSON, LEICESTER, England**

TH 2



**No problem with Ina cam followers**



*Precision made, incorporating Ina Needle Cage.*

**Ina Needle Bearings Ltd.**

Dept. M., Head Office and Factory, Ina Works, Dafen, Llanelly, Carms.
Tel : Llanelly 4312/3/4 Telex : 4816

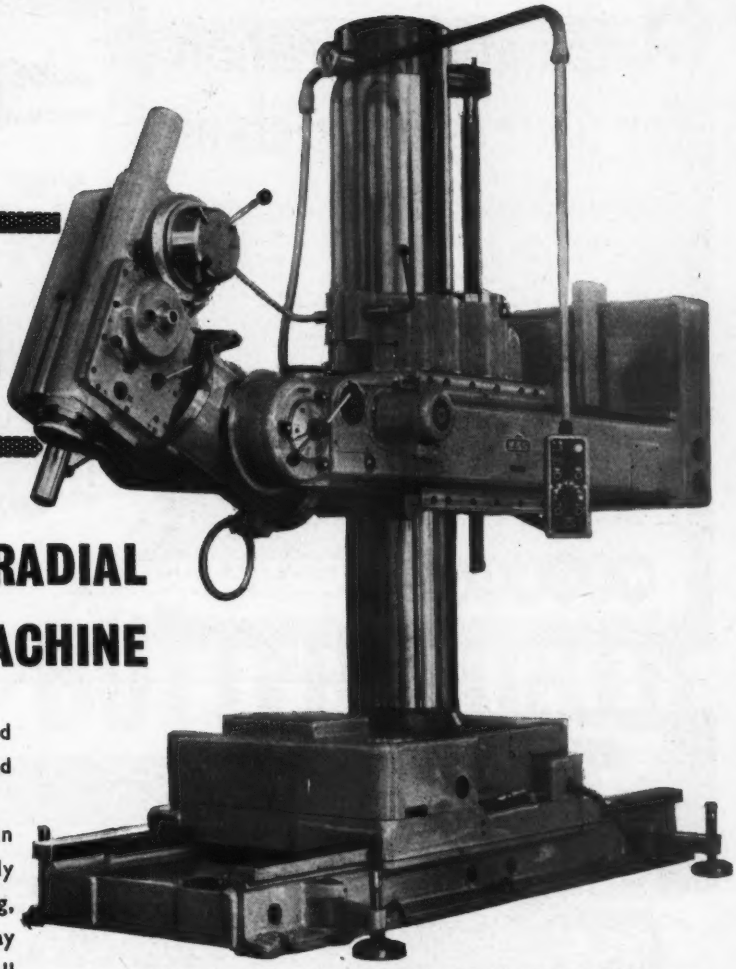
**INA Bearings are manufactured in Great Britain, France and Western Germany.**

INA

**SEND FOR COPY OF THE NEW TECHNICAL HANDBOOK & NEW 136 PAGE CATALOGUE**

MAS

# VRM 50A



## UNIVERSAL RADIAL DRILLING MACHINE

For drilling, reaming and thread cutting large and bulky workpieces.
Ideal for heavy duty work in Production and Assembly shops such as bridge building, boiler construction, railway and shipbuilding yards. All movements are easily controlled by push-buttons on a pendant arm.

- Drilling Capacity 2"
- Drilling Motor 5 h.p.
- Spindle Speeds (15) 16-800 r.p.m.
- Arms swivels through 360°.

**IMMEDIATE DELIVERY.**

*THE BIG MACHINE FOR THE BIG JOB!*

EXCLUSIVE DISTRIBUTORS IN THE UNITED KINGDOM.

**ELGAR MACHINE TOOL COMPANY LIMITED**

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555
MIDLANDS SHOWROOM: 1075 KINGSBURY ROAD, ERDINGTON, BIRMINGHAM 24. Tel: Castle Bromwich 3781/2
SOLE SCOTTISH AGENTS: ANGUS & CRICHTON (SALES) LTD., 7 MIDLAND STREET, GLASGOW C.1. TELEPHONE: CITY 4560 3205

*When answering advertisements kindly mention MACHINERY.*

N2

# ✳ Automatic operation for your own capstans

with NICKOLS
AUTOMATIC SEQUENCE CONTROL

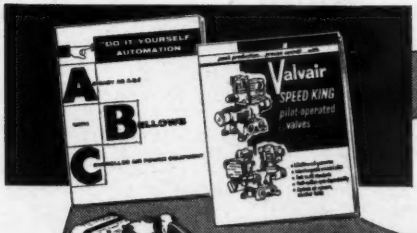
✳ **INFINITE VERSATILITY**

With the NICKOLS AUTOMATIC SEQUENCE CONTROL you can retain all the advantages of the capstan lathe — simple setting, inexpensive tooling, modest capital outlay, ease of maintenance, versatility of application, etc., and supplement them with many of the more valuable features found only in automatic lathes. Rigid control of feed rates means longer life and greater accuracy from delicate form tools. Complete programme control gives maximum efficiency and consistent output — without cams or expert setting . . . and don't forget that the transformation of HERBERT and WARD capstans is accomplished in your own works in 2½ days!

- GREATER DIMENSIONAL CONSISTENCY
- EASY & RAPID SETTING
- LONGER TOOL LIFE
- ROBUST & RELIABLE

Write for details to:—

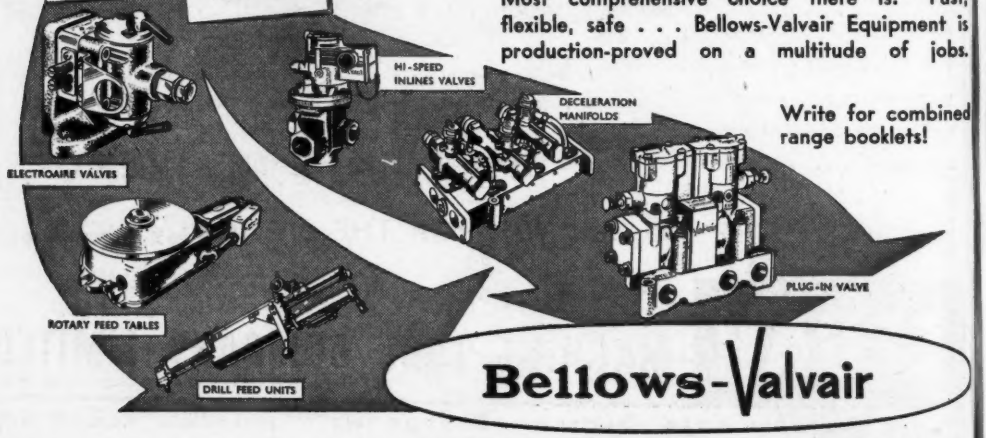
NICKOLS AUTOMATICS LIMITED
7 CARLISLE RD., LONDON, N.W.9. Phone COLindale 6141




**from the widest range of all !**

You can now choose air power equipment from the combined ranges of Bellows and Valvair. Most comprehensive choice there is! Fast, flexible, safe . . . Bellows-Valvair Equipment is production-proved on a multitude of jobs.

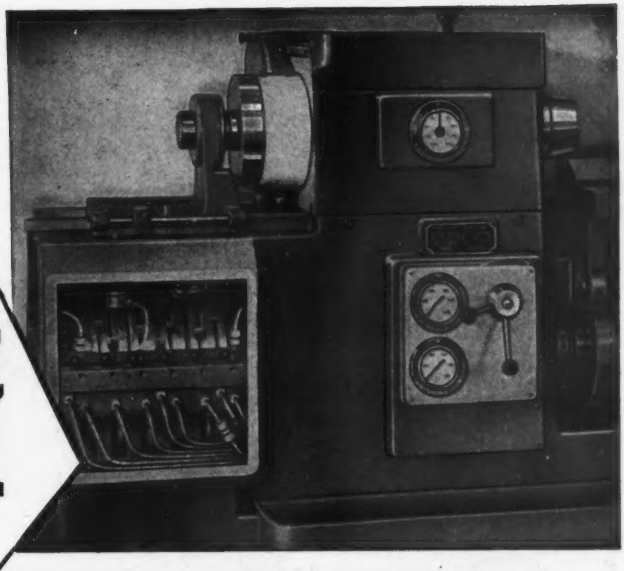
Write for combined range booklets!




Bellows-Valvair

CONTROLLED AIR POWER EQUIPMENT

BELLOWS-VALVAIR LTD., 1206, STRATFORD ROAD, HALL GREEN, BIRMINGHAM 28. Tel: Springfield 6059



# HYDRAULIC CONTROL

for GREATER FLEXIBILITY — GREATER PRODUCTION CAPACITY

# BUTTERWORTH

## HYDRAULIC AUTOMATIC

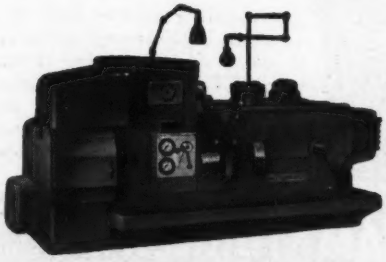
*cuts costs on short or long runs*

● ADVANCED DESIGN ● NEW STANDARDS OF PRODUCTIVITY ● INFINITELY VARIABLE FEED CONTROL ● NO SPECIAL CAMS

Here is a machine to meet to-day's demand for lower costs. Ample power, combined with foolproof hydraulic control of feed, elimination of special cams, and great flexibility ensure the highest possible production rates, even on small batches. Note, too, the chucking and bar feed are hydraulically operated.

The range of sizes covers work from 1⅛", 2", 2½", 3" & 3½" diameter bar. Hydraulic copy turning attachment and cross slide longitudinal turning attachment available.

Other sizes and models include ⅞" SD, ⅞"-1 1/16" SD, 1¼" AG, 3" AG & 3½" AG.



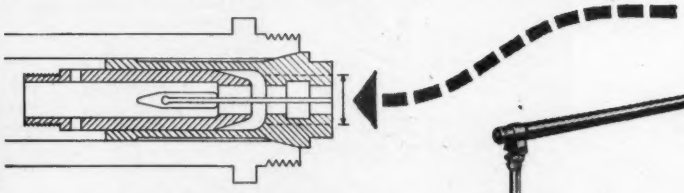
*Write for complete details :*

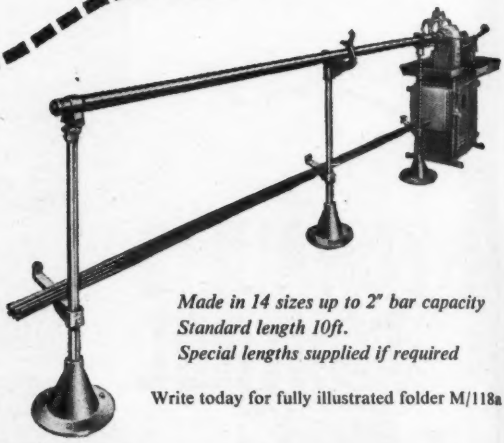
**BUTTERWORTH**

**BRITISH AUTOMATIC MACHINE TOOL CO. LTD.**

**LINCOLN STREET, ROCHDALE**

# Here's where you get the *EXTRA* Capacity





## with PUCKERT
## Air operated BAR FEED

For Capstans and single spindle Autos. No feed fingers or sleeves. Feeds round, square, hexagon, or other section bar without marking its surface, right up to the back face of the collet. Safe and quiet. Re-loading is the work of a moment. Thousands in service fitted to all makes of machines.

SOLE WORLD DISTRIBUTORS

*Made in 14 sizes up to 2" bar capacity*
*Standard length 10ft.*
*Special lengths supplied if required*

Write today for fully illustrated folder M/118a

**DOWDING & DOLL LTD**
346 KENSINGTON HIGH STREET, LONDON, W.14
*Tel:* WESTERN 8077 (8 lines) *Telex:* 23182 *Grams:* ACCURATOOL LONDON TELEX

118a

# B&T SHIM WASHERS

★

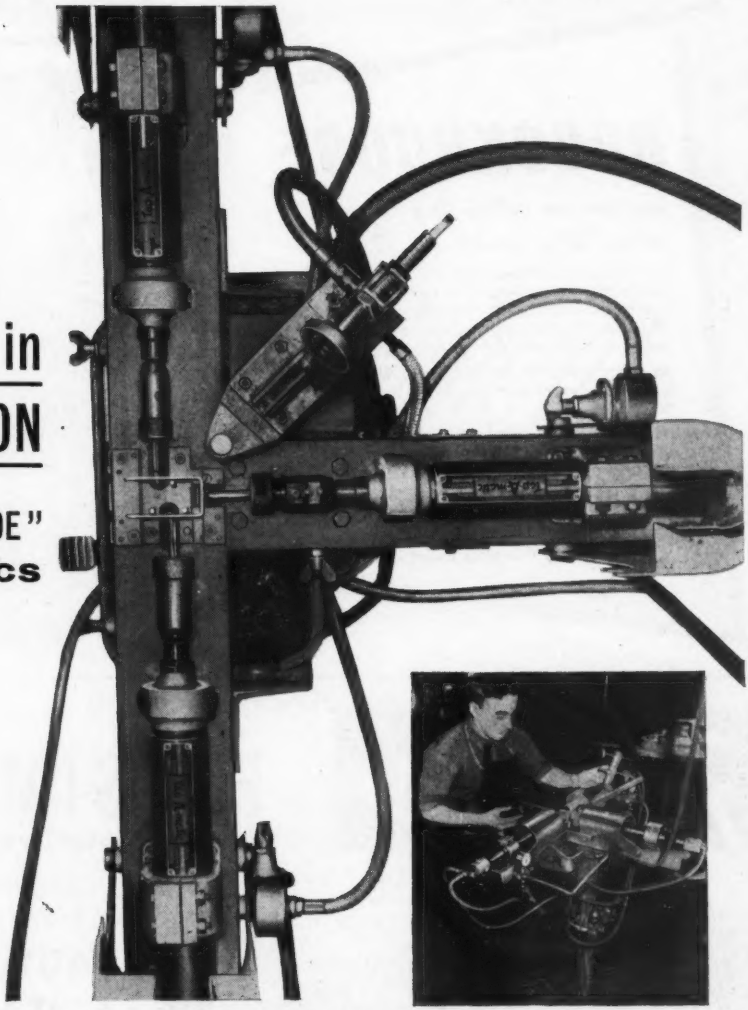
Made in diameters from $\frac{1}{8}$" to 10" with bores to suit, and any quantity, material, brass, or steel shim stock, in thicknesses between .002" and .06". Also laminated shims up to 6" dia. Tab washers and shims of irregular shapes can also be produced. We shall be pleased to receive your enquiries.

**BONEHAM & TURNER LTD** MANSFIELD NOTTS PHONE 896

# 50% INCREASE in PRODUCTION

with

## "ARO-BROOMWADE" Tap-a-Matics





"ARO-BROOMWADE" TAP-A-MATICS enable multiple tapping to be performed where previously only single tapping was possible. This can effect significant increases in production rates.

Frigidaire, Division of General Motors Ltd., obtained a substantial increase in the production of Stainless Steel Switchframes by installing the TAP-A-MATIC set-up illustrated above. A large number of variations and set-ups are possible. Why not discuss **your** production bottlenecks with a "BROOMWADE" works-trained representative? Why not write NOW!

***Publication No. 443 T.E. will give you preliminary data.***

A three-station TAP-A-MATIC set-up devised by Frigidaire, Division of General Motors Ltd., for tapping U-shaped stainless steel switch-frame brackets. The following holes are tapped simultaneously:

5/16" x 24 T.P.I. Right Hand Thread
5/16" x 40 T.P.I. Left Hand Thread
14 x 40 T.P.I. Right Hand Thread

The TAP-A-MATIC unit has given trouble-free service ever since it was installed 2 years ago.

Photograph by courtesy of Messrs. Frigidaire, Division of General Motors Ltd.

# "BROOMWADE"

***AIR COMPRESSORS & PNEUMATIC TOOLS : YOUR BEST INVESTMENT***

Broom & Wade Ltd., P.O. Box No. 7, High Wycombe, Bucks. Telephone: High Wycombe 1630 (10 lines) Telex: 83-127

863 SAS

# BROCKHOUSE

***engineered rebuilding***

***saves 50% costs . . .***

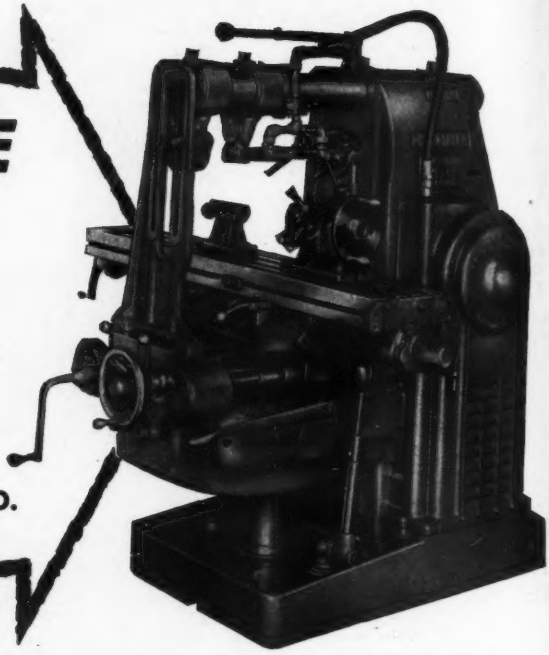
Our method of rebuilding with the unconditional guarantee to meet the original manufacturers' specification, will give you the equivalent of a new machine at 50 per cent. of its cost.

In many cases we can help to bring the old design to the modern standards required today.

We also convert standard equipment to specials as well as building special application machines.

***J. BROCKHOUSE & CO. LTD.***

Elms Works, Penn Road, Wolverhampton
Phone: Wolverhampton 23801

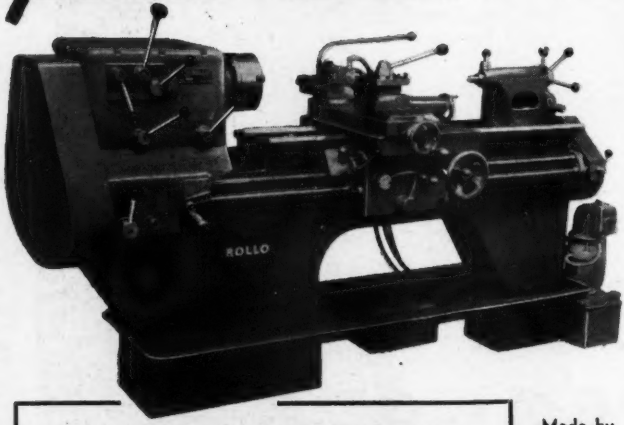


---

Rollo

# FACSIMILATHE

**14" SWING HIGH SPEED COPYING LATHE**




10 Spindle Speeds 39 - 1,000 R.P.M.
20 Speed Feed Box

**AUTO FEED TO TAILSTOCK**

**OIL BATH APRON & FEED BOX**

***Available as follows :***

Copying and Centre Lathe with Auto Feed to Tailstock

Copying and Centre Lathe

Centre Lathe with or without Auto Feed to Tailstock

***THE 'FACSIMILATHE' CAN BE SEEN WORKING AT :***

The Machine Tool Co. Ltd., London Road, Nottingham

Made by

**ROLLO INDUSTRIES LTD.**

ST. ANDREW'S WORKS, BONNYBRIDGE, SCOTLAND

# Announcement

**The G. A. GRAY COMPANY, CINCINNATI, U.S.A. ...**

...world famous manufacturers of Planers, Milling Machines — Planer Type, as well as Horizontal Milling and Boring Machines and Kearney & Trecker — C.V.A. Ltd., Hove, Sussex, have recently concluded a licence agreement.

The latter has acquired the exclusive right to manufacture GRAY products, beginning with the FLYING SCOT, and has been appointed sole selling agent for both American and British built machines in the U.K. and British Commonwealth of Nations (excluding Canada).

*Further announcements will be made.*

**KEARNEY & TRECKER-C.V.A LTD.**

GARANTOOLS HOUSE • PORTLAND ROAD • HOVE • SUSSEX *Tel: Hove 47253 Cables: Ceveatools (Telex) Hove*

LONDON • BIRMINGHAM • GLASGOW • MANCHESTER • BRISTOL

she's a precision operator with the help of ....

**PEISELER**

QUICK CLAMPING DRILL JIGS

These jigs incorporate a built-in clamping system with interchangeable drill and location plates. They replace expensive special jigs and rough templates, give rapid clamping with complete accuracy combined with rigidity. Even small batches can be jigged economically and a great variety of workpieces can be produced in the same jig merely by exchanging the drill and the location plates.

MSE

GD 645

MACHINE SHOP EQUIPMENT LTD., Spenser St., London, S.W.1. Telephone: VICtoria 6086

# INDUMA VR5

## VERTICAL MILL

**Rapid Traverse in all directions.**
**Centralised controls. Hardened and ground gears.**

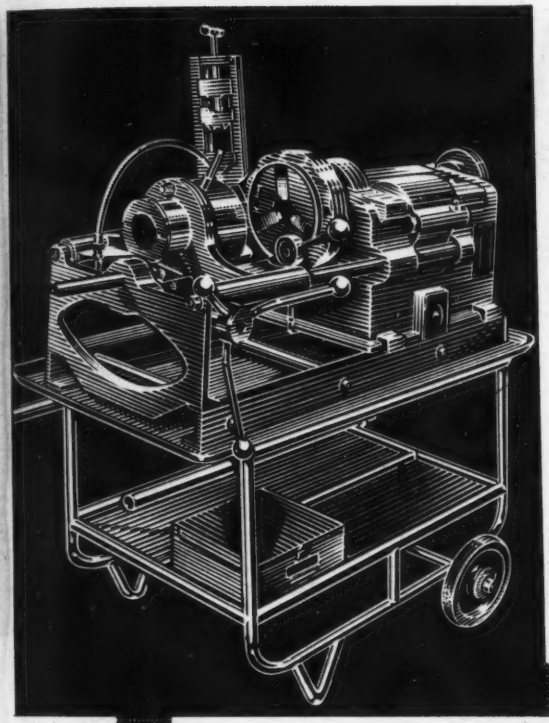
| | | |
|---|---|---|
| Table ... | ... | ... 80in. x 16in. |
| Traverse: | Cross ... | 15½in. |
| | Longitudinal | 53in. |
| | Vertical ... | 19¾in. |
| Spindle Speeds (24) 25-1, 520 r.p.m. | | |

★ **ALSO AVAILABLE MODEL VR3 TABLE 60" x 12" AND FOUR SIZES OF UNIVERSAL MILLERS WITH TABLES FROM 52" x 11" to 79" x 16"**

**Available through your local stockists**

GATE MACHINERY CO. LTD
172–178, VICTORIA ROAD ACTON LONDON W3
Tel: Acorn 8881/2 Telex: 2111

NRP 3470



S&B

## Smart & Brown (machine tools) Ltd.

*Manufacturers of high precision lathes announce a new . . .*

# pipe screwing machine

The machine is designed for pipe, conduit, bolt or bar work, on site or in the workshops, and is furnished with tangential die-head, sine bar, cutting off, de-burring and built-in grinding attachments, coolant pump and fittings.

The machine has a capacity up to 2″ and suitable for the following:—

| | | | |
|---|---|---|---|
| B.S.P. | — $\frac{3}{8}$″ to 2″ | U.N.C. | — $\frac{3}{8}$″ to 1$\frac{1}{2}$″ |
| A N.P. | — $\frac{1}{2}$″ to 2″ | U.N.F. | — $\frac{3}{8}$″ to 1$\frac{1}{2}$″ |
| A.P.I. | — $\frac{1}{4}$″ to 2″ | Whit. | — $\frac{3}{8}$″ to 1$\frac{1}{2}$″ |
| Conduit | — $\frac{3}{4}$″ to 2″ | B.S.F. | — $\frac{1}{2}$″ to 1$\frac{1}{2}$″ |

Receder heads extend capacity up to 8″ B.S.P.

**Smart & Brown (machine tools) Ltd.**

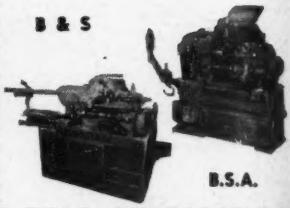
25 MANCHESTER SQUARE · LONDON · W.1

*Telephone: WELbeck 7941-5 Cables: Smartool, Wesdo, London.*

MAKERS OF PULTRA MICRO LATHES AND GRINDING MACHINES

*Member of the GAS PURIFICATION AND CHEMICAL GROUP OF COMPANIES*

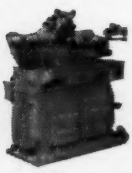
# MELBOURNE

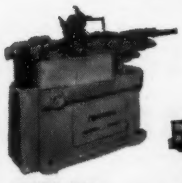


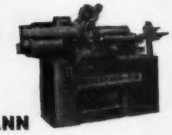

**THE SPECIALISTS IN THE REBUILDING OF TURRET TYPE AUTOMATICS**

*Can now offer*

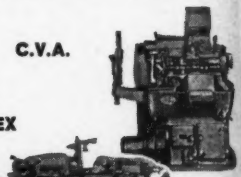
**THE SAME UNSURPASSED RE-BUILDING SERVICE FOR SWISS-TYPE AUTOMATICS**


BECHLER


TORNOS


PETERMANN

- Machines are rebuilt to original specification of accuracy and limits.
- All parts fitted are interchangeable with maker's spares.
- Reconditioning not only costs less than a new machine but can also be charged wholly as a maintenance expense ranking for full tax relief.
- We can loan a machine equivalent to the one taken out thereby assuring customer of his continuity of production.



★ May we visit your works and quote for reconditioning your machine?

**MELBOURNE ENGINEERING CO. LTD., MELBOURNE, Near DERBY**

(H. E. SLAWSON, M.B.E., M.I.P.E., Man. Director) Tel: MELBOURNE 232

# Tudor ALL STEEL TOOL & STORAGE CABINETS

No. 5 FULL DOOR LARGE MODEL £11 . 5 . 0

No. 6 CLOTHING LOCKER

Prices on application

No. 1 THREE-QUARTER DOOR £6 . 18 . 6

No. 2 FULL DOOR £7 . 7 . 6

No. 3 THREE-QUARTER DOOR £5 . 15 . 0

No. 4 FULL DOOR £5 . 19 . 6

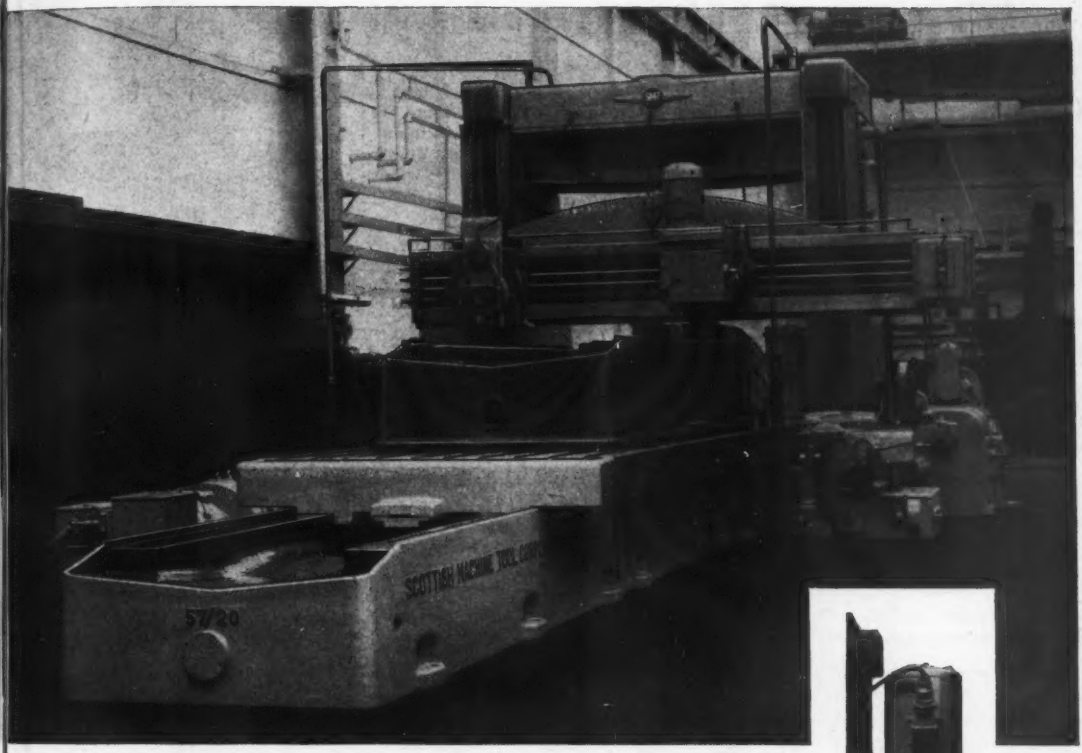
*A type for every purpose!*

WRITE TODAY FOR FURTHER DETAILS & PRICES

**JOHN S. YOUNG & CO. LTD.**

TUDOR WORKS, BURNFIELD ROAD, GIFFNOCK GLASGOW. TEL. MERRYLEE 2393 (5 LINES)

MADE IN SCOTLAND



CLYDE BUILT SMT GLASGOW MACHINE TOOLS

# HEAVY DUTY PLANERS

The illustration shows an 8′ 0″ x 6′ 0″ x 24′ 0″ Planing Machine on test in our Loudon Works, prior to its delivery to our Bennie Works, where it is to be used in the manufacture of our Plate and Bar Working Machinery. In the photograph, a test job is the end bed of one of our Planing Machines.

This Machine, as is the case with all our latest Planers, has the closed loop system of electrical drive, giving cutting speeds up to 220ft. / min. (Higher speeds can be arranged when required). The reversal and accelerating characteristics of the drive are much improved, giving faster cycle times, with excellent power curves.

The robust proportions of the Machine will be noted, also the bed with its inverted flat ways for easy maintenance and reliable lubrication. All slides are square lipped.

Two styles of milling head are available, one with a two-speed motor drive, and one, as fitted to this Machine in the illustration, with gear-box drive. These heads are easily interchangeable with the cross slide tool boxes, and are designed to utilise the latest type of tungsten carbide cutters. Feeds are provided in both the longitudinal and transverse directions, greatly increasing the versatility of the Planing Machine and enabling more operations to be done at one setting. Very considerable rates on metal removal can be achieved.

We invite your enquiries for two-column, openside, rail, and horizontal and vertical Planing Machines.

**SCOTTISH**

**MACHINE TOOL CORPORATION LTD.**

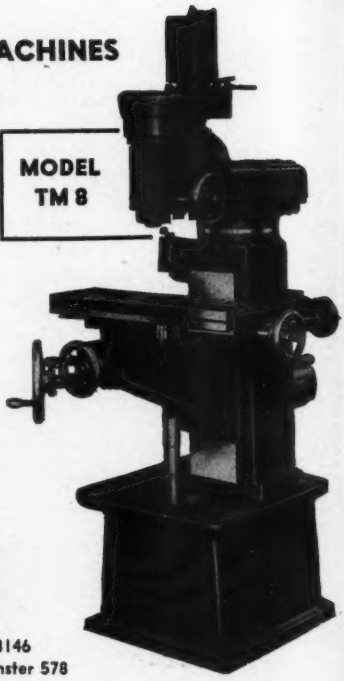
17 Lynedoch Cresc., Glasgow, C.3.
DOUGLAS 6586/9

Lion House, Red Lion St., Richmond, Surrey
RICHMOND 7667/9

256 Moseley Road, Birmingham, 12.
CALTHORPE 2541

The Building Centre, Brunswick Ter., Leeds, 2.
LEEDS 25250

# MARLOW VERTICAL MILLING MACHINES




• Backgeared Head 85-1,500 r.p.m. 6 speeds. • 5 speed Direct drive, 375-2,250 r.p.m. available on Models 1, 2 and 3. • All models have Swivel Head. • Power Feed available as an extra on all models except 1 and 2. • Down Feed Head, hand operated, available on Models 4 and 5 and Turret Mills.

**STANDARD MILLS**

| Model | Table | Table to Spindle |
|---|---|---|
| 1 | 22" x 6½" | 16" |
| 2 | 28" x 6½" | 16" |
| 3 | 28" x 8" | 15" |
| 4 | 28" x 8" | 19" |
| 5 | 28" x 10" | 19" |

**MARLOW TURRET MILLS**

Radial and Sliding Arm, Swivelling and Down Feed Head. Power Feed to table optional.

| Model | Table | Table to Spindle |
|---|---|---|
| T.M.8 | 28" x 8" | 19" |
| T.M.10 | 28" x 10" | 19" |

**VICTA ENGINEERING CO.**
Head Office THICKET CORNER · MAIDENHEAD Phone 50.

London Area: Eagle Works, Chester Road, Boreham Wood, Herts. Tel: ELS 3146
Southern: Eagle Works, Blandford Road, Hamworthy, Poole. Tel: Lytchett Minster 578

*Visit the*

# DRAWING OFFICE EQUIPMENT & MATERIALS EXHIBITION

**JUNE 5-6-7-8, 1961**

**Royal Horticultural Society's New Hall : Westminster, S.W.1**

For the first time under one roof practically every possible drawing office requirement will be available for examination, study, comparison and selection.

DRAWING OFFICE EQUIPMENT AND MATERIALS EXHIBITION

**ADMISSION TICKET**

**Drawing Office Equipment & Materials Exhibition**
**Royal Horticultural Society's New Hall, Westminster, S.W.1. June 5-6-7-8, 1961.**
Mon., Tues., & Wed., 10 a.m.—6 p.m. Thurs., 10 a.m.—4 p.m.

**Please Admit**

*Name* .....

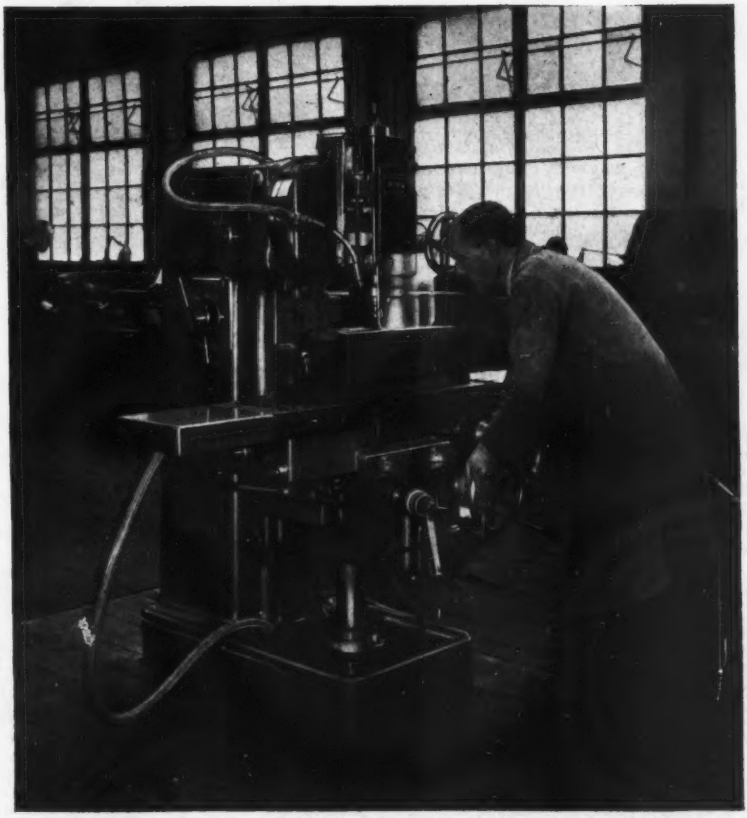
*Company* .....

.....

.....

*Position in company* .....

# RIGIVA milling machines...



## ...at Marshall, Sons & Co. Ltd.

**'The machine is giving every satisfaction', say Marshalls of this Rigiva V.6., recently installed in their toolroom, where the photograph shows it being employed for sinking a bottom forging die. 'Every satisfaction' is the key-note of the Rigiva range of universal and vertical milling machines. Write for our fully illustrated booklet.**

**Trade Terms to Bona Fide Machinery Merchants**

Sole Selling Agents for United Kingdom :

**THOS. W. WARD LTD** | **ALBION WORKS · SHEFFIELD**
*Phone: 26311 (22 lines) Grams: "Forward, Sheffield"*

LONDON OFFICE: BRETTENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2. Telephone: Temple Bar 1515
MACHINERY SHOWROOMS AT: GLASGOW, SILVERTOWN, BRITON FERRY

M-63

*When answering advertisements kindly mention MACHINERY.*

# UPAM V.500

*The Big Capacity*

## BANDSAW

WITH 45° SWIVEL

The Upam V-500 cuts up to 20" dia. bar and 20" x 20" section. Blade swivels 15° right and 45° left. Maintains initial accuracy through many years of service.

***INFINITELY VARIABLE HYDRAULIC FEED***

✻ FIXED FRAME MODEL ALSO AVAILABLE

CATMUR MACHINE TOOL CORPORATION LIMITED

103 Lancaster Road, Ladbroke Grove, London, W.11. 'Phone PARk 9451/2

NAP 2907

# Thos. Wm. Lench Ltd.

PHONE: BLACKHEATH 1151 — BLACKHEATH BIRMINGHAM ENGLAND. — GRAMS: LENCHONIA, BLACKHEATH, BIRMINGHAM

MAKERS OF

# Bolts, Screws, Rivets.

# Speed with Accuracy

That's been our slogan for years, and my word these sturdy Burdett Slotters give you that in full measure. They're versatile, too. We use them for all sorts of jobs, from gear cutting to die-sinking. The tooling's simplicity itself, and they're so easy to operate and service: they are what I call "getatable". Reminds me, I must see about that new 14" stroke machine we're installing.

6½" GENERAL PURPOSE MACHINE

12" STROKE TOOLROOM MACHINE

G.W.S. BURDETT & CO. LTD.
EASTGATE PETERBOROUGH
Telephone 4871

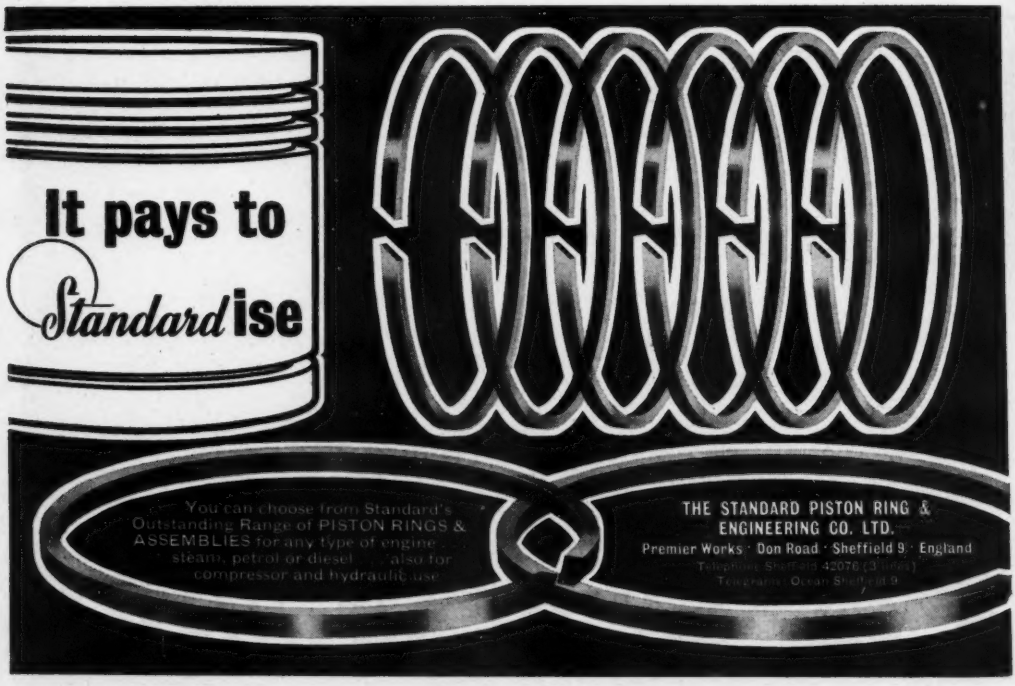
# Engraving 3 SCRIPTA ENGRAVERS cover all requirements

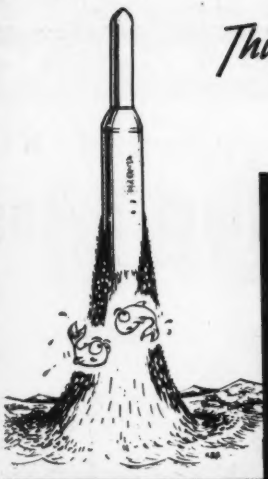
1. **TYPE S.D.** for straightforward engraving 2. **TYPE S.R. 2D** for heavy duty work
3. **TYPE S.R. 3D** for mould making and three dimensional work

*Write for fully illustrated leaflet*

**ACBARS LTD.** 57A HOLBORN VIADUCT · LONDON · E.C.I.

*Telephone : CENtral 2287/8/9. 6811/2.* *Telegrams: Acfirb, Cent, London*


It pays to
Standardise
You can choose from Standard's Outstanding Range of PISTON RINGS & ASSEMBLIES for any type of engine steam, petrol or diesel also for compressor and hydraulic use
THE STANDARD PISTON RING & ENGINEERING CO. LTD.
Premier Works · Don Road · Sheffield 9 · England

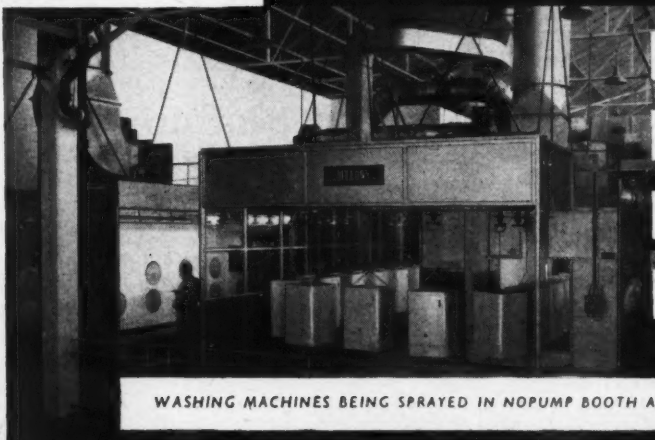


*This is nothing to what goes on inside a*

# BULLOWS

## NOPUMP SPRAY BOOTH

In this new type of Water-Wash Spray Booth the exhaust air travels at very high velocity over the water surface entraining water. The air/water mixture, moving through controlled changes of direction, provides the scrubbing action.



**NO PUMP**

**NO FILTERS**

**NO PIPES**

**NO NOZZLES**

*WASHING MACHINES BEING SPRAYED IN NOPUMP BOOTH AT ADA (HALIFAX) LTD.*

## CUTS MAINTENANCE BY 90%

**Longer time between clean-outs**

**Residues completely broken down and easily handled**

**Lack of adhesion of deposits**

**Smooth, easily cleaned surfaces**

**Low first cost due to simplicity**

**Occupies minimum space**

*WRITE FOR FULL DETAILS FROM*

**A. BULLOWS & SONS LTD · LONG ST · WALSALL · STAFFS · TEL 27251**

DEPOTS AT: 13 SOUTH MOLTON ST., LONDON, W.1. TEL: MAYFAIR 2313
55a BRIDGE ST., MANCHESTER, 3. TEL: BLACKFRIARS 5670
70 GILMOUR ST., GLASGOW, C.5 TEL: SOUTH 2383
61-63 DRURY ST., DUBLIN TEL: DUBLIN 73188/9

**BULLOWS (AUST) PTY. LTD., ETHEL AVENUE, BROOKVALE, SYDNEY AUSTRALIA**

# Presswork and Springs of every type

**IN ALL METALS TO THE FINEST LIMITS**
**SPECIALISTS IN BERYLLIUM COPPER**
**PROGRESSIVE PRESS TOOLS**
**MULTI SLIDE AND TRANSFER PRESSES**
**HIGH PRODUCTION DEEP DRAWING**

***Electro (Spark) Erosion for the Trade***

**Helical Tension, Torsion and Compression Springs and Wire Shapes from 40 S.W.G. (0·0048in.) to $\frac{3}{16}$in. dia. Wire**

***FULLY A.I.D. AND A.R.B. APPROVED***

## SPRING STEEL PRODUCTIONS LTD.

***Factories Pressings:*** **784-788 HIGH ROAD, TOTTENHAM LONDON, N.17 · TEL: TOTTENHAM 7745/7**
***Coiled Springs:*** **COMMERCE TRADING ESTATE, RAVEN ROAD SOUTH WOODFORD, E.18**

# DRILLMAX

## ADJUSTABLE CENTRE MULTI-DRILL HEADS

### "V" SERIES UNIVERSALLY ADJUSTABLE CENTRE MULTI-DRILL HEADS

Made in four sizes to suit either medium or heavy drilling requirements—quick adjustment—positive locking.

- ★ Hard Light Alloy Body
- ★ Hardened and Ground Gear Drive
- ★ Ball Type Universal Joints
- ★ Anti-Friction Bearings
- ★ Bush Lugs provided for Guide Rods
- ★ Spindles run at the same speed and direction as the drilling machine spindle.

High quality product designed and made for continuous productive service.

### "M" SERIES ADJUSTABLE MULTI-HEADS

Made in 12 Models to cover wide range of application.

ROBUST - COMPACT - TOTALLY ENCLOSED

- ★ Rapid positive adjustment: simply slacken Central Locking Screw, turn spindle to desired position and re-lock.
- ★ Minimum of rotating parts.
- ★ Positive Drive by Heat Treated Gears.
- ★ Quick vertical adjustment to Spindles.
- ★ Light Alloy Bodies with Lugs for Guide Bars.
- ★ Designed for either Self-oiling or Roller Bearings, dependent upon Model Size.
- ★ Silent operation.

BRASSHOUSE *Drillmax*

**Drillmax Division, Leighswood Works, Leighswood Road, Aldridge, Staffs,**
**Telephone: Aldridge 52439.**

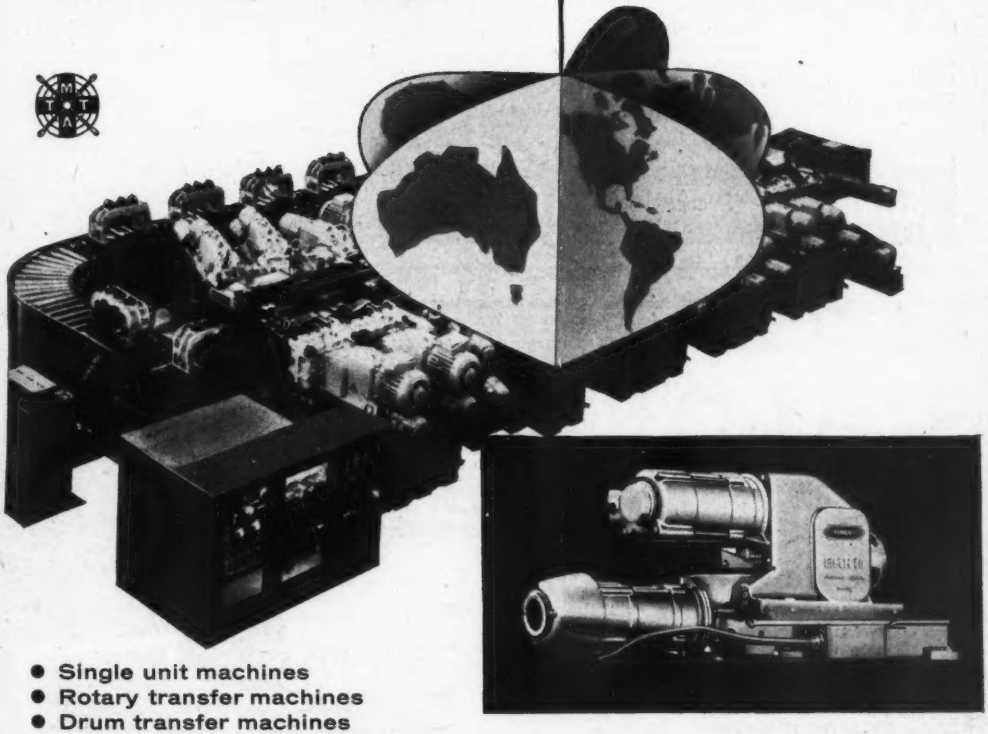
MACHINE TOOLS
RENAULT
SHREWSBURY ENGLAND

**PRODUCTION-PROVED**

# MACHINE-TOOLS

***INCORPORATING ELECTRO-MECHANICAL HEADS FROM 1½-15 HP***

## operating throughout the 5 continents



- Single unit machines
- Rotary transfer machines
- Drum transfer machines
- In-line transfer machines
- Special purpose machines

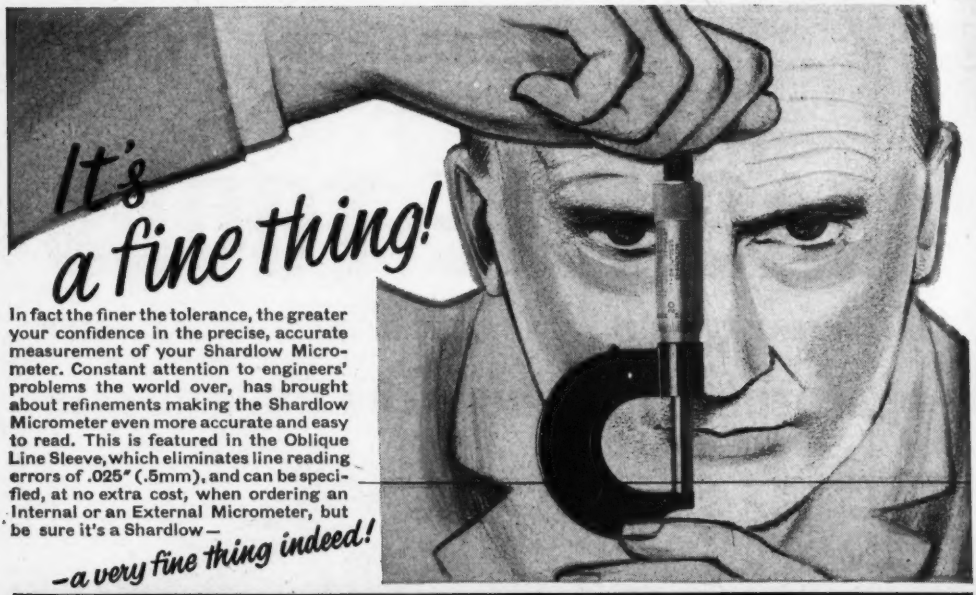
*16mm English sound film available on loan*

**RENAULT MACHINE TOOLS (U.K.) LTD**

SHREWSBURY ENGLAND PHONE SHREWSBURY 52317

*(a wholly-owned subsidiary of Regie Nationale des Usines RENAULT Paris)*

P.5017



*It's a fine thing!*

In fact the finer the tolerance, the greater your confidence in the precise, accurate measurement of your Shardlow Micrometer. Constant attention to engineers' problems the world over, has brought about refinements making the Shardlow Micrometer even more accurate and easy to read. This is featured in the Oblique Line Sleeve, which eliminates line reading errors of .025" (.5mm), and can be specified, at no extra cost, when ordering an Internal or an External Micrometer, but be sure it's a Shardlow—

*—a very fine thing indeed!*

**SHARDLOW MICROMETERS LIMITED** PETRE STREET · SHEFFIELD 4

Phone: 38095 1/2 Grams: MICROMETERS SHEFFIELD

---

**THE CALORIZING PROCESS**

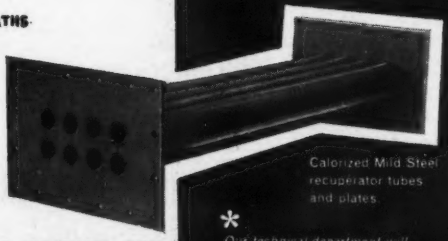
*A few applications of the Calorizing Process*

CASE-HARDENING BOXES AND POTS · ANNEALING BOXES AND POTS
SALT BATH POTS · CYANIDE BATH POTS · LEAD BATH POTS
MOLTEN METAL CONTAINERS · PYROMETER PROTECTION SHEATHS
RECUPERATOR AND AIR HEATER TUBES · FURNACE MUFFLES
SUPERHEATER SUPPORTS · SOOT BLOWER ELEMENTS
KILN PIPES AND CAPS · FURNACE DAMPERS
LADLES FOR METAL POURING
NITRATE OF SODA BATHS · RETORTS
TUBES FOR WIRE ANNEALING FURNACES
FURNACE HEARTH PLATES · FURNACE COMPONENTS

*Write for publication No. 1301/1*

THE CALORIZING CORPORATION OF GREAT BRITAIN LTD.
LYNTON HOUSE, 7/12 TAVISTOCK SQUARE, LONDON, W.C.1. Tel: EUSton 4321
*Works: Renfrew & Dumbarton*

For the protection of Ferrous metals against oxidation at high temperatures

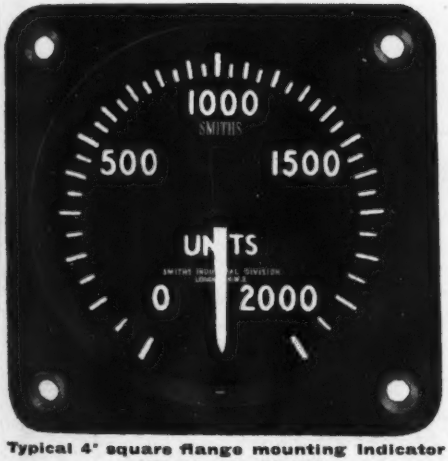


Calorized Mild Steel recuperator tubes and plates

* *Our technical department will be pleased to advise on problems associated with high-temperature oxidation of ferrous metals*

# rugged robust reliable

plus all the accuracy you need




Typical 4" square flange mounting indicator calibrated in 'Units'

## SMITHS 'Desynn' system of remote indication

We're giving fair warning. Once you instal SMITHS 'Desynn' system you can forget it. It is a really rugged system which stands up to the toughest assignment. Operating from 12 or 24 v D.C. supplies, with two or three indicators operatable from one transmitter and with Single- or Multi-channel recorders available. SMITHS 'Desynn' system will indicate such functional information as:—

*Angular Position*
*Fluid Level*
*Force*
*Linear Position*
*Differential Pressure, etc., etc.*

Flameproof and watertight versions available.

fit and forget | SMITHS 'Desynn' system of remote indication

*Write for full details to*

**SMITHS INDUSTRIAL DIVISION**

**Chronos Works, North Circular Road, London NW2 · Phone: GLA 6444**

The industrial business of S. Smith & Sons (England) Ltd, including the marketing of industrial products under the trade marks of Smiths and Kelvin Hughes

*When answering advertisements kindly mention MACHINERY.*

★ ALWAYS CONTACT

Brown Brothers (METALS) Ltd

(A MEMBER OF THE BROWN BROTHERS LTD GROUP OF COMPANIES)

FOR MILLS Ledloy

DOWNS ROAD, LONDON, E.5. Telephone : CLIssold 2561

PRESSED STEEL

sections : trench sheeting : road forms

troughing : dovetail sheeting : gutters

PALLETS and STILLAGES

PRESS BRAKE WORK OF ALL DESCRIPTIONS

including holing and welding as required.

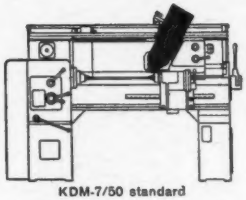
DORMAN LONG (Steel) LTD. AYRTON ROLLING MILLS, MIDDLESBROUGH

London Office: Terminal House, 52 Grosvenor Gardens, S.W.1. Telephone: SLOane 2275

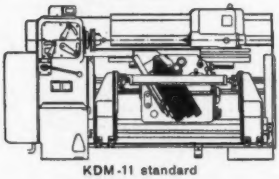
DORMAN LONG

# +GF+

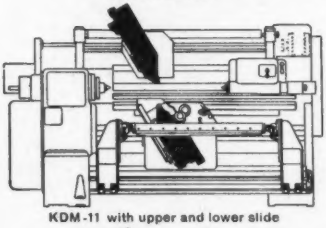
## Copying Lathes



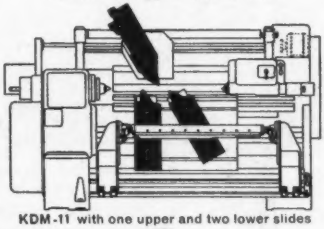
KDM-7/50 standard



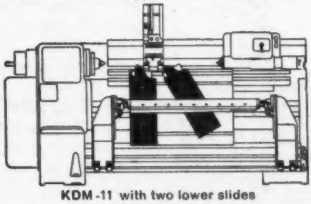
KDM-11 standard



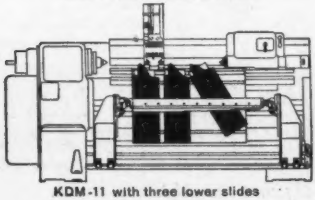
KDM-11 with upper and lower slide



KDM-11 with one upper and two lower slides



KDM-11 with two lower slides



KDM-11 with three lower slides

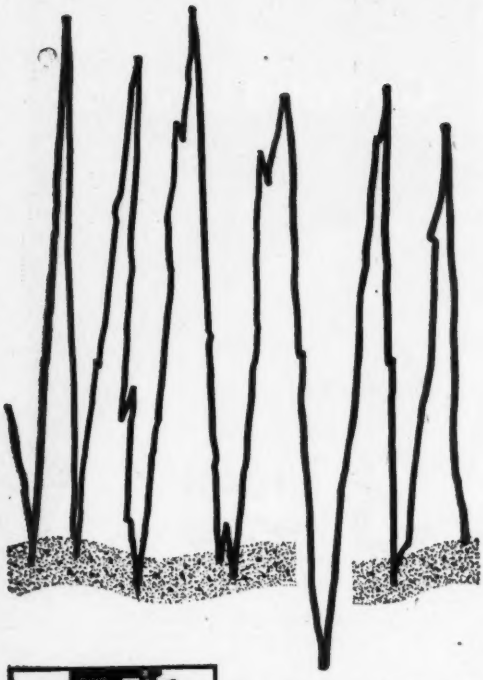
## 4 New Ways 3 Times Faster

**resulting from the combination of the +GF+ Copying Lathes KDM-7 and KDM-11**

- 4 new models
- greatly reduced production times owing to multiplied single-tool copy-turning
- independent upper and lower slides
- internal and external copying in both directions
- multiplex lower carriage:
  one feed carriage;
  copying slides operating separately in the vertical or at a slant;
  one copying template for each slide;
  overlapping turning lengths.

**VAUGHAN**
**ASSOCIATES LIMITED**
VAUGHAN HOUSE, 4 QUEEN STREET,
CURZON STREET, LONDON, W.1
Telephone: GROSVENOR 8362-5
**Midland Office:** WILFORD CRESCENT,
NOTTINGHAM Tel.: NOTTINGHAM 88008

WZ 1884/4a



Imagine the reduction in nervous tension amongst your employees when you reduce vertical vibration by 80%. Imagine the reduction in machine wear, too. Yet an 80% reduction is perfectly feasible for many types of machinery with the Croid-Cooper method of installation, where the machine is simply stuck down on a felt base with a holding power of 80 lbs. to the square inch. May we send you details?

**THE CROID COOPER METHOD OF MACHINE FIXING DAMPS VIBRATION**

**CROID 65**

**MACHINE FIXING GLUE**

**COOPERS FELT**

**COOPER & COMPANY (Birmingham) LIMITED**

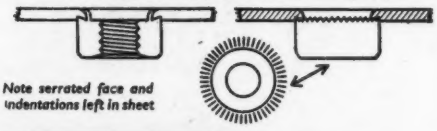
*Head Office and Works:*
BRYNMAWR, BRECONSHIRE TELEPHONE: 312
*Branch Office and Works:*
SEELEY'S ROAD, BIRMINGHAM 11 TELEPHONE: VIC 5417

**Wunop**

*Patent applied for No. 31597/57*

**RIVET BUSH**

New type permanent insert bush single blow fixing. Suitable for sheet metal, plastic or plywood, All threads up to ¼in.



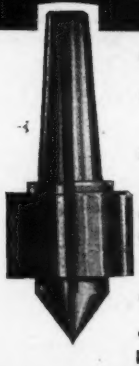
*Note serrated face and indentations left in sheet*

**BENTON ENGINEERING CO. LTD**

TONBRIDGE ROAD, HAROLD HILL · ESSEX
Phone: Ingrebourne 43864 & 43865

**COXETER**

*Revolving Centres*



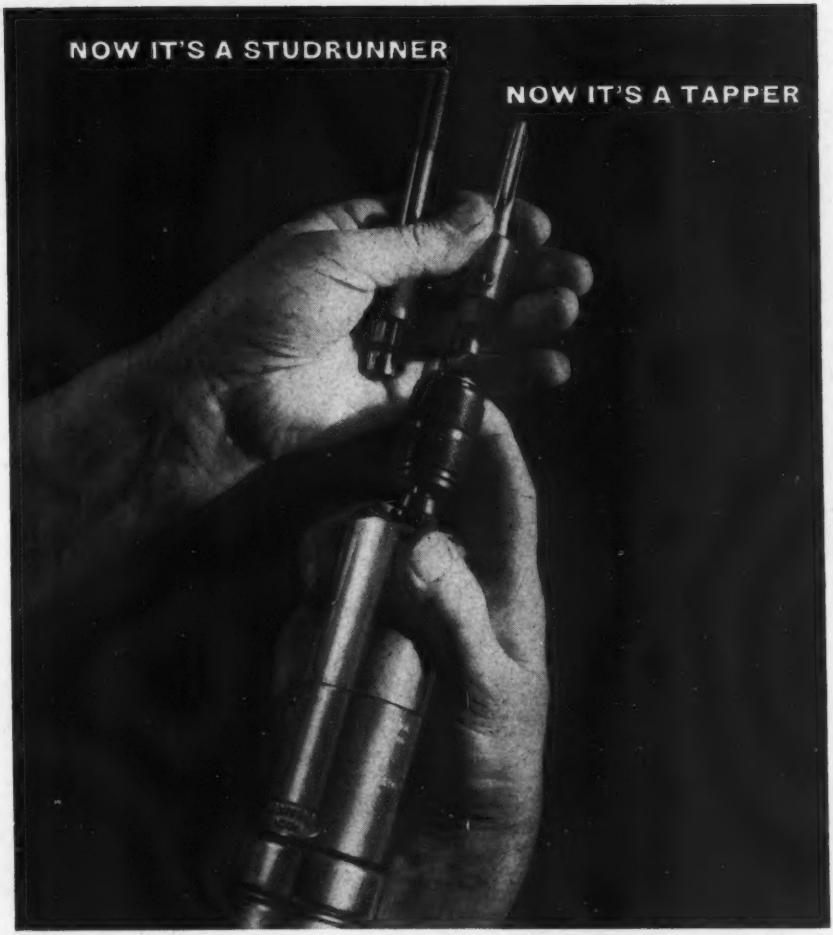
- Models for Bar or Tubular work
- Standard sizes, morse taper and parallel shanks
- Best Cast Steel construction hardened and ground
- Heavy duty bearings
- Especially suitable for heavy cutting with tipped tools
- Special sizes quoted for
- Quick Deliveries

**IMPROVED TYPES**

*Price list on application*

**REVOLVING CENTRES LTD.**

40-41 PARK END STREET, OXFORD
*Phone:* OXFORD 42275/6 *Grams:* COXETERS, OXFORD




**One tool does the work of two !** One operator with this Desoutter tool can do *two* jobs; he can tap holes and run studs, and he can do both jobs quicker, easier and cheaper. The Desoutter tapper-studrunner is just what you want on one-off assembly work. It works on the push-pull principle; when you pull it out it reverses automatically at twice the forward speed. And it has a quick-release chuck that lets you change over from tapper to studrunner in seconds. There's a type, size and weight for the job *you* have in mind. Ask us for further details.

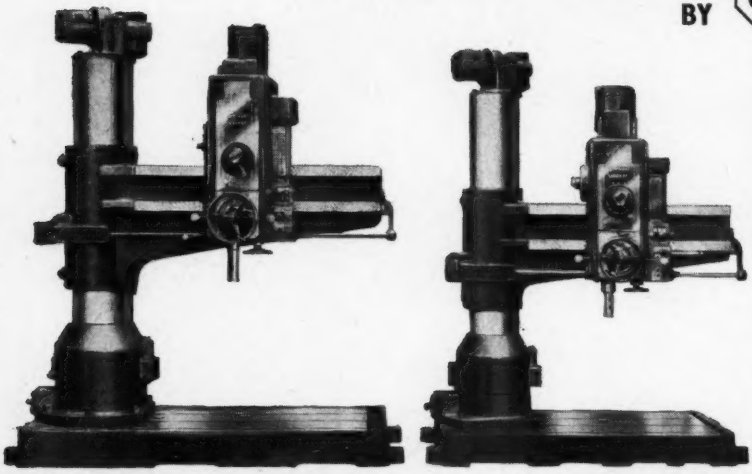
| TYPE | TAPPING SPEED | REVERSED SPEED | CAPACITY IN STEEL in. | CAPACITY IN STEEL mm. | WEIGHT lb. | WEIGHT kg. |
|---|---|---|---|---|---|---|
| R.16/75 | 900 | 1,800 | $\frac{1}{4}$ | 6 | $4\frac{1}{2}$ | 2.0 |
| R.16/40 | 460 | 920 | $\frac{5}{16}$ | 8 | $4\frac{1}{2}$ | 2.0 |
| R.16/25 | 315 | 630 | $\frac{5}{16}$ | 8 | $4\frac{1}{2}$ | 2.0 |

DOUBLE YOUR MONEY WITH *Desoutter*

DESOUTTER BROTHERS LTD · THE HYDE · HENDON · LONDON N.W.9 · COLINDALE 6346

CRC 341

# NEW AND BETTER HIGH PERFORMANCE RADIAL DRILLS BY KITCHEN-WALKER



## 18 SPEEDS
## 9 FEEDS

MODEL E2
3ft. 0in. to 5ft. 0in. radius.
2in. Cap. 12in. Col.

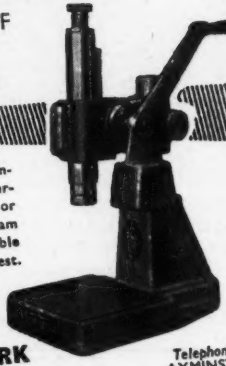
MODEL E3
4ft. 0in. to 6ft. 0in. radius.
3in. Cap. 14in. Col.

**A. KITCHEN-D. WALKER LTD. PELLON LANE HALIFAX ENGLAND**

Telegrams: RADIAL, HALIFAX Telephone: HALIFAX 67824

---

For
**LIGHT RIVETING, RAPID ASSEMBLY**
& MARKING OF SMALL COMPONENTS



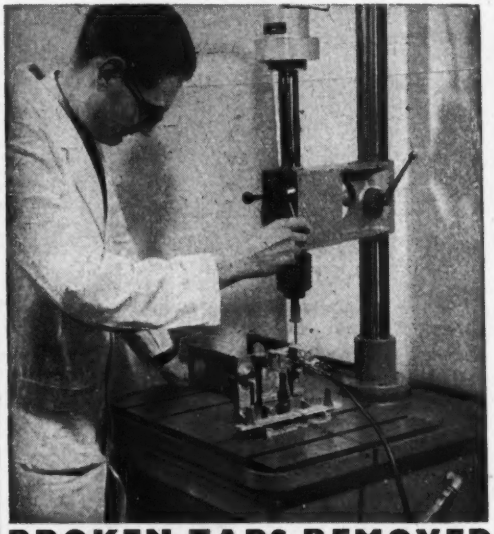
A highly efficient press with controlled and adjustable blow ensuring consistent results on large or small batches of work. Table to ram 8in. maximum working size of table 7¼in. × 8¼in. Full details on request.

*The* **MODELMARK PERCUSSION PRESS**

Telephone: AXMINSTER 3114

**J. H. SHAND LTD.**
AXMINSTER, DEVON

---



**BROKEN TAPS REMOVED**
**24-HOUR SERVICE**

*Don't throw away parts spoilt by the breaking-in of taps, drills, reamers. Send them to us for reclamation by the latest electric disintegration process.*

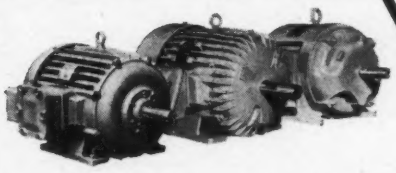
**VISUAL PLANNING SYSTEMS LTD.**
ATHLON ROAD, ALPERTON, WEMBLEY, MIDDX. PERIVALE 9935/6

# Manual Skill or Power Tools

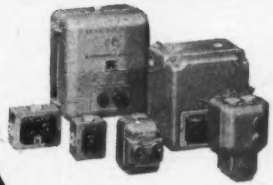
**In this age of automatic machines, there are still some tasks which require the touch of an experienced hand. Bending the bars of this slip ring rotor for instance, to give it the required electrical characteristics.**

**Electric motor making combines a variety of manual skills with modern automated production equipment for component manufacture. A Brook electric motor contains the best of both spheres; mechanical precision and experienced labour.**

**They give you the world's most respected motor.**



**The Brook Industrial range includes Drip Proof, Fan Cooled and Explosion Proof types. Horse Power ratings up to 600 according to type and speed.**



**Use Brook Control Gear, automatic or hand operated types to match popular motor ranges.**

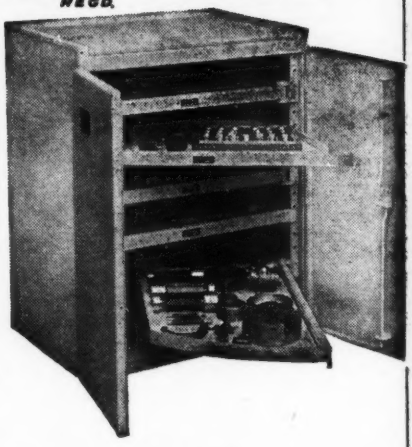
BROOK ELECTRIC MOTORS

## BROOK MOTORS LTD

HUDDERSFIELD

# VERSATOOL
REGD.

cabinets For



**Precision Tools**

**Equipment Instruments Etc.**

**W. PINDER & SON LTD., KING STREET, PETERBOROUGH**

P2907

# MARLCO

**MINOR INDEXING ATTACHMENT**

. . . Standard index plate of 12 divisions. Special plates up to 20 divisions. Supplied with collet mounting and interchangeable 5½in. table. Standard collets $\frac{1}{16}$in.-$\frac{3}{4}$in. by $\frac{1}{32}$in. dia., specials on request. Can be locked in any position.
LARGER ATTACHMENT ALSO AVAILABLE.

**W. H. MARLEY & CO. LIMITED**
**NEW SOUTHGATE WORKS, 105 HIGH RD., LONDON, N.11**
*TELEPHONE: ENTerprise 5234 5578*

# 'MURENCO'
*Regd.*

**MURENCO ROLLERS AND PINS**
To Suit the Following Box Tools
**WARD PATTERN**—No. OE, 2A, 3A, 7, 7 COMB.
**BROWN & SHARPE**—No. 00EA, 20EA, 22EA.
**HERBERT**—No. 00, 0, 1 CAP, 1.2D & 2S CAP, 4, 4B & 4 SEN.
**INDEX**—No. 1, 2, 3.
**TAYLOR**—No. 1, 2, 3.

**ALL SIZES EX STOCK**
THESE ROLLERS ARE GUARANTEED TO BE CONCENTRIC AND OF THE FINEST PRECISION.
LEAFLETS ON APPLICATION, INDICATING DIAMETER, WIDTH BORE, ETC.

*Manufactured by:*
**MURRAY'S PRETORIA ENGINEERING CO. LTD.**
**26-2 PRETORIA ROAD, ROMFORD, ESSEX ROMFORD 42380.**

360° SAFE
with SEEGER CIRCLIPS
Automotive Engineering Limited
The Green, Twickenham, Middlesex
Telephone :- POPesgrove 2206/9
Telegrams :- Motif Twickenham
ONE OF THE SHEEPBRIDGE ENGINEERING GROUP
SEEGER CIRCLIPS ARE ON THE ROLLS-ROYCE APPROVED LIST

SUMMIT
MILLING CUTTERS - SLITTING SAWS
REAMERS - GEAR CUTTERS - HOBS
END MILLS - PARTING OFF TOOLS
CIRCULAR SHEARING CUTTERS
BEVEL KNIVES - CIRCULAR FORM TOOLS

**JOSEPH THOMPSON (SHEFFIELD) LIMITED**

Townhead Street Engineering Works, Sheffield 1. England Telephones: 24021 (Three lines) Telegrams: "Summit, Sheffield"

*Grinding and Polishing consult* RJH

**UNIPOL**

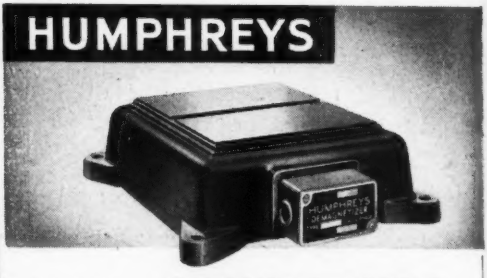
**ABRASIVE BAND POLISHER**

Universal application for deburring, grinding or polishing small components. Band can be set in vertical or horizontal position. **PRICES FROM £67-10-0**

**R. J. H. TOOL & EQUIPMENT CO. LTD.**

**HECKMONDWIKE, YORKS**
**Tel: Heckmondwike 490**

**HUMPHREYS**



*Platen Type*

**DEMAGNETISERS**

**This is a useful type of demagnetiser for quickly dealing with ordinary components in workshops. It is only necessary to pass the magnetised pieces over the platens and they instantly loose the magnetism**

**J. H. HUMPHREYS & SONS LTD.**
BLACKRIDING ELECTRICAL WORKS
WERNETH OLDHAM.

TELEGRAMS: HUMPHREYS OLDHAM
TELEPHONE: OLDHAM MAIN 6067

US RUBBER PowerGrip

TEETH THAT TOOK NINE YEARS TO GROW!

Great inventions don't just happen. And PowerGrip—U.S. Rubber's exclusive *toothed* timing belt—was no exception. While others had pondered, theorised—and failed, only one man stood the test and tension of nine years' study, trial and error that preceded success. Today, PowerGrip is an indispensable part of every facet of modern life. Kitchen mixers and power stations, sewing machines and atomic submarines all rely on the compact, non-slip transmission, quiet, precise operation of PowerGrip timing belts. Pioneered and manufactured in the U.K. only by The North British Rubber Co. Ltd.

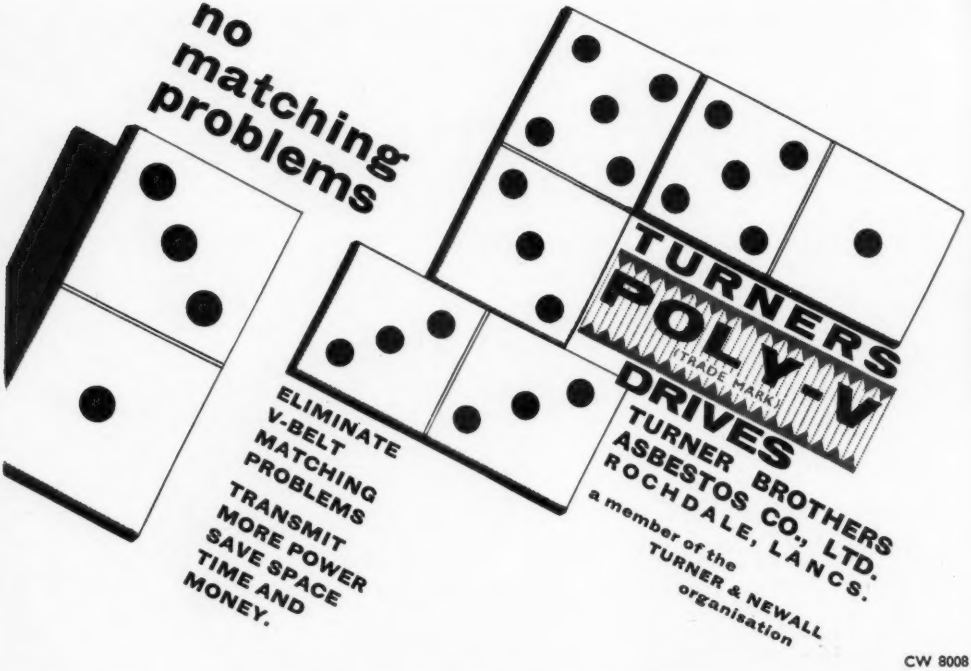
The inventor of the PowerGrip, Mr. Richard Case, has been associated with the Gilmer Division of U.S. Rubber for most of his working life. As a token of recognition for his "invention of high order", he was awarded the Longstreth Medal by the Franklin Institute of Philadelphia. Others accorded this high honour include Edison, Marconi and Bell.

US North British

Write for comprehensive literature

**Solely manufactured in Great Britain by**
**THE NORTH BRITISH RUBBER CO. LTD.**
**62/64 Horseferry Road, London S.W.1. Tel: Abbey 5611**
**Factories: Castle Mills, Edinburgh and Heathhall, Dumfries**

**ALSO WORLD FAMOUS FOR: OIL, AIR, STEAM, & WATER HOSE · CONVEYOR BELTING · DOCK FENDERS · EXPANSION JOINTS**




CW 8008

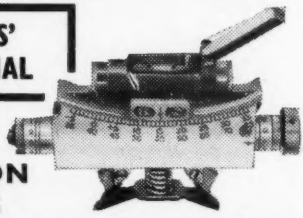
## "RUBERT" Surface Roughness Scales

Provide a reference of calibrated Surface Roughness for comparison of machined surfaces by sight and touch, and fulfil the need for a simple, dependable standard for visualizing, selecting and specifying surface conditions for production work.

We supply complete sets and single standards for special requirements to B.S.S. 1134: 1960, Accuracy 10% or 20%.

**RUBERT & CO. LTD.**
Acru Works, Demmings Road,
Councillor Lane, Cheadle, Cheshire.
Telephone: Gatley 5855

**14 DAYS' FREE TRIAL**



**EX-M.O.S. PRECISION TOOLS**

**TOOLROOM CLINOMETERS (Micrometer Bubble Type)**
An Engineers' Clinometer of great precision. Main scale is divided 0-20° in 1° divisions and angles to within ¼ minute can be read speedily on the micrometer thimble. For their original military purpose a clip was fitted to the base but this clip can easily be removed in the Machine Shop. Net weight 22 ozs. Length of base 3¾in. **35/-**

**GERMAN DRAWING INSTRUMENT SETS**
Brand new in velvet lined case. - - - - - - - **£2.7.6.**

**TIME & MOTION STUDY STOP WATCHES**
Cost approx. £7. Offered in perfect condition. - - **55/-**
Also available Ex-M.O.S. High quality
**WALTHAM STOP WATCHES**
1/5th second with minute recorder - - - - - - **£3.15.0.**
***Decimal dials can be fitted to most of our Stop Watches if desired.***

**OPTICAL TEST SET** for the Research Lab. containing 36 carefully graded lenses of Crown glass. Focal lengths 4in. to 120in. Dia. 47 mm. All in the new Vu-File transparent pack. - - **42/-**

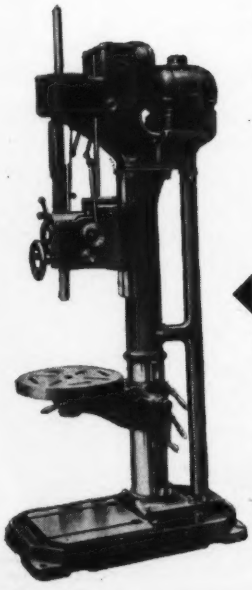
**OPTICAL TEST SET** with 30 assorted lenses, prisms, polaroids. - - - - - - - - - - - - - - - - **£2.**

**CHARLES FRANK LTD.** Phone: BELL 2106/7 Grams: BINOCAM Glasgow
**67/75 SALTMARKET, GLASGOW, C.1.** Est. 1907
*Britain's greatest stocks of new, used and Ex-Government Optical and Scientific Equipment. Send for illustrated catalogue.*

*When answering advertisements kindly mention MACHINERY.*

# WHATEVER THE DUTY
## — if it's verticals

## . . . it's CORONA



### MODEL 28 AN
HEAVY DUTY GENERAL PURPOSE DRILL

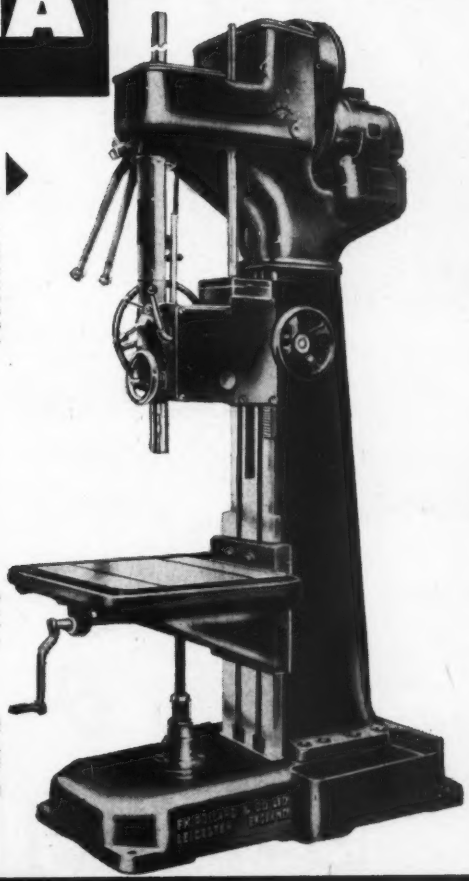
With a drilling capacity of up to 2in. in M.S., these machines have nine spindle speeds up to 489 r.p.m. and six automatic feeds, with electric reverse if required. Ball bearing mounted gear drive. Available in gang drills with two to six columns on one base. Two other models available, with capacities of 1¾in. and 1½in. respectively.

### MODEL 21 AR
ROUND COLUMN MACHINE

Available in three sizes with capacities of 1¾in., 1½in. and 2in. respectively. Similar in performance and characteristics to the box column machine.

*

THERE ARE 'CORONA' DRILLING MACHINES FOR EVERY DUTY FROM SUPER HIGH SPEED SENSITIVE TO HEAVY DUTY SINGLE SPINDLE AND MULTI-DRILLS. CONSULT US ON YOUR OWN DRILLING PROBLEMS.



**FREDK POLLARD & CO. LTD.**

CORONA WORKS, LEICESTER, ENGLAND · TELEPHONE: LEICESTER 67534 (5 lines)

London office: COASTAL CHAMBERS, 15 ELIZABETH ST., BUCKINGHAM PALACE RD., S.W.1. TEL: SLOANE 8880
Scottish Representatives: WALTER S. LANG & CO., 48 OSWALD STREET, GLASGOW, C.1. Tel: CENTRAL 2539
North East: HODSON MACHINE TOOLS LTD., 150 NEW BRIDGE STREET, NEWCASTLE-UPON-TYNE.

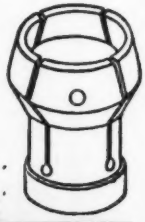
*Saved!*

**ACBARS can supply**

*Crawford* **COLLETS**

**from stock . . .** for automatics, capstan athes, precision lathes, milling machines, drilling machines etc. Crawfords, specialists in collets for over 60 years, can supply collets of every size and shape. Standard types are held in stock, and specials can be made to your specifications.

Write or 'phone to:



**ACBARS LIMITED**

**16-18, MACLEOD STREET**
**WALWORTH ROAD,**
**LONDON, S.E.17 · Tel.: RODney 7191**

***The London Stockists for Crawford Collets and Chucks.***

**TOOL SHARPENING**

*Quicker-Easier*

*On the*

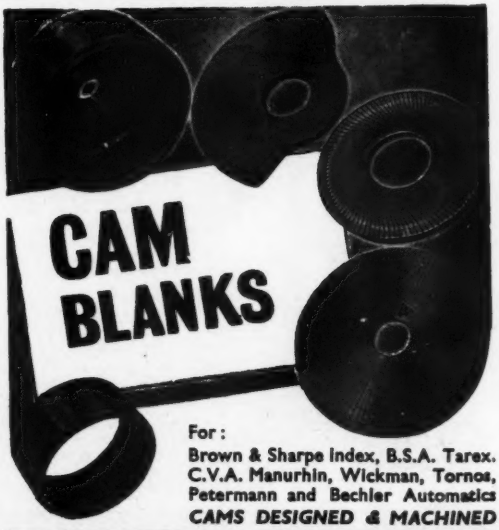
**DAVID Dowling**

**TOOL & CUTTER GRINDER**

A feature of this cutter grinder is the 180° rotation of workhead allowing side and face cutters to be ground on periphery and both sides without removal from between workcentres. Capacity 9in. by 13in.

**DAVID DOWLING LTD · BATES ROAD, ROMFORD**

Telephone: Ingrebourne 43904/5



**CAM BLANKS**

For:
Brown & Sharpe Index, B.S.A. Tarex. C.V.A. Manurhin, Wickman, Tornos, Petermann and Bechler Automatics

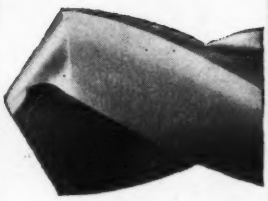
***CAMS DESIGNED & MACHINED***

**MOSER CAMS & TOOLS LTD.**

465, HORNSEY ROAD, LONDON, N.19.

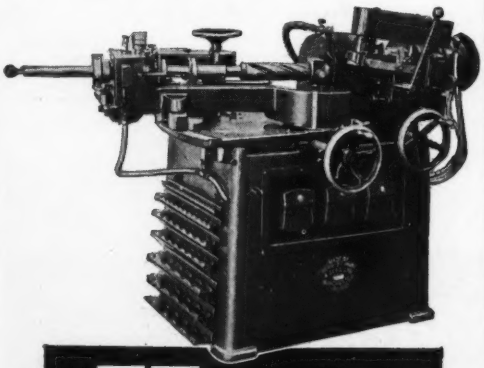
Tel.: ARCHWAY 1766 and 7017

## Prolong drill life . . . maintain high cutting performance



You really must find a place in your tool-room or machine shop for a Hunt Drill Point Grinder. It will ensure better drill point sharpening and point thinning, longer drill life, more accurate holes and faster rates of penetration in whatever metal you handle.

Ask for details of our range which includes medium and heavy duty models.



**HUNT**
MACHINE TOOLS

***TWIST DRILL POINT GRINDING MACHINE***

HERBERT HUNT & SONS LIMITED
MACHINE TOOLS
Elsinore Road, Old Trafford, Manchester 16, England
Tel: Trafford Park 0663
Grams: Hunting Manchester 16

## For BUSHES and BEARINGS

**From ½" Solid to 4" Solid or Cored**

★ *100% fault free*
★ *Any length up to 6ft.*
★ *Super finish and quality*
★ *Dimensional accuracy*

**ALSO**
**Centrifugal Cast and Chill Cast**
Range of sizes from ½" solid to 11½" cored

*Send today for full details*

THE **EYRE** SMELTING CO. LTD.
*Also makers of TANDEM WHITE METALS & ESCO GUN METAL INGOTS, etc.*

TANDEM WORKS · MERTON ABBEY · LONDON S.W.19 Tel: MITCHAM 2031
ALUMINIUM WORKS · WILLOW LANE · MITCHAM · SURREY Tel: MITCHAM 2240

people are talking....

...about

**LIGHTHOUSE**

*LONGER-LIFE ENGINEERS' FILES*

Well, of course they are! They all know a good thing when they see it—and the fine quality of John Baker's ' LIGHTHOUSE ' Brand Engineers' Files, combined now with a 24-hour delivery service—is enough to start everyone talking.

A standard ' LIGHTHOUSE ' file was tested recently at The Sheffield Testing Works Ltd. The report showed that on a direct comparison with a file complying with the standard specifications, the ' LIGHTHOUSE ' file saved enough money to buy one dozen similar files.

This is one of the advantages of buying ' LIGHTHOUSE ' Brand—the name which carries 125 years of file manufacturing experience.

**JOHN BAKER & SONS LTD.**

MONMOUTH WORKS
MALINDA STREET
**SHEFFIELD · 3**
Telephone : Sheffield 28916

**You Save Money EVERY TIME WITH**

**CROSS**
**THE BRITISH WIRE THREAD INSERTS**

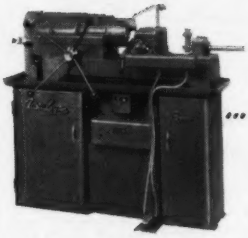
HARD THREADS IN SOFT MATERIALS
NEW THREADS FOR OLD In damaged components
FULL RANGE OF SIZES AND THREAD STANDARDS IMMEDIATELY FROM STOCK
*Samples on Request*

**CROSS MANUFACTURING CO. (1938) LTD., BATH, SOMERSET**

*Tel: Combe Down 2355-8* *Grams: Circle Bath*
SPECIALISTS IN THE MANUFACTURE OF JET ENGINE LABYRINTHS, CIRCLIPS, SPRING WASHERS, SPRINGS, ETC.

**CENTAMAX—**

**NEW** TIME-SAVING FROM THIS MACHINE



CAN YOU FACE IT?

*... and centre it too?*

Can you face these hard facts—the time you are wasting on centering and facing bar stock in preparation for your centre or copy lathe?

*So here is an opportunity for NEW time-saving on a much neglected job. At under £650 basic "CENTAMAX" is a machine that YOU can afford.*

*Automatic speed change—FAST for centering—SLOW for facing*

*Sole Distributors:—*
**Monks & Crane Ltd.**
BIRMINGHAM · LONDON · MANCHESTER · GLASGOW
NEWCASTLE-ON-TYNE · BRISTOL · LEEDS

SM/MC 6376

# STEEL KEY TO INDUSTRY

*No. 12*

*This hand-wrought 15th Century chest or chatelaine key, made during the reign of the first Tudor King, Henry VII (1485-1509), is a beautiful example of the period.*

The development of steel made possible the growth of civilisation itself. For steel is the key to the good things of life as well as to the necessities; as essential to the maker of the precision watch as to the bridge-builder.
Hallamshire high-grade Alloy and Carbon steels serve a multitude of industries in many ways.

**Hallamsteel**

*Manufacturers of*
**ALLOY & SPECIAL CARBON STEELS**
**BARS · SHEETS · PLATES · WIRE RODS**

THE HALLAMSHIRE STEEL COMPANY, LIMITED · SHEFFIELD, 3 · ENGLAND
*Telephone:* Sheffield 24304 (7 lines) · *Telegrams:* Hallamsteel, Sheffield

## *TURN these shapes with the . . .*

# CHATWIN

## *Polygon tool box*

This lathe attachment will turn hexagon, octagon, square or other shapes from round stock and drill and finish in ONE OPERATION.
It will bore holes for perfect matching to most shapes and turn mating shapes for a curved triangular drive.

*Write for the new fully illustrated colour brochure.*

## THOMAS CHATWIN & CO.

**Gt. Tindal Street, Birmingham 16.** *Tel. Edgbaston 3521*

**Area Sales Offices in London, Bristol, Manchester and Newcastle upon-Tyne.**

# LENCHS

(B'HAM) LTD.

*The home of good toolmaking*

SOLE MANUFACTURERS OF

**OAKALOY**

CARBIDE TIPS & TOOLS

***YOUR "SPECIALS" OUR SPECIALITY**

**"OAKALOY" CARBIDE PRESS TOOLS**

*LITERATURE ON REQUEST FROM—*

Head Office & Works—

BARR STREET, BIRMINGHAM 19

Tel: Northern 8421 (4 lines). Grams: Lentools, B'ham, 18

# MEKELITE

GEARED JOINT

**INDUSTRIAL LIGHTING UNITS**

Sudsproof head

Where trouble is experienced on machine tools due to suds getting into the lampholder, the sudsproof head with enclosed lampholder can be used instead of the standard head.

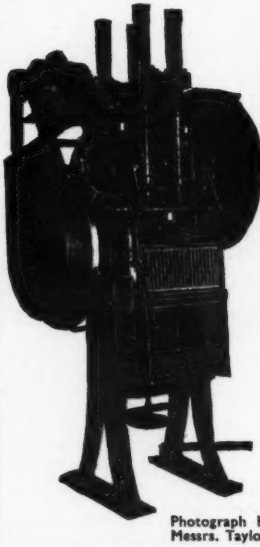
Various lengths of arm (maximum horizontal reach 54in.). With pillar or short vertical pivot. Five sizes of reflector. Bases for wall, bench, ceiling, floor or for mounting direct on machines. Also portable types.

*Catalogue sent free on request*

**MEK-ELEK Engineering Ltd.**

17, Western Road, Mitcham, Surrey

Telephone: MITcham 3072 Cables: Mekelek, London



**P.M.G. INTERLOCK PRESS GUARD**

Easy feeding through the exceptionally large aperture with perfect safety for the operator who can close the "Camlock" guard either manually or automatically with the Newmatic Sequential Air Operation Unit. The Guard design avoids taking up tool space and large area top tools are accommodated. Interlocks are provided with the clutch and crank shaft.

Send for details today given in Leaflet No. 43.

PRICE

Photograph by permission of Messrs. Taylor & Challen Ltd.

**PRICE MACHINE GUARDS LTD.**

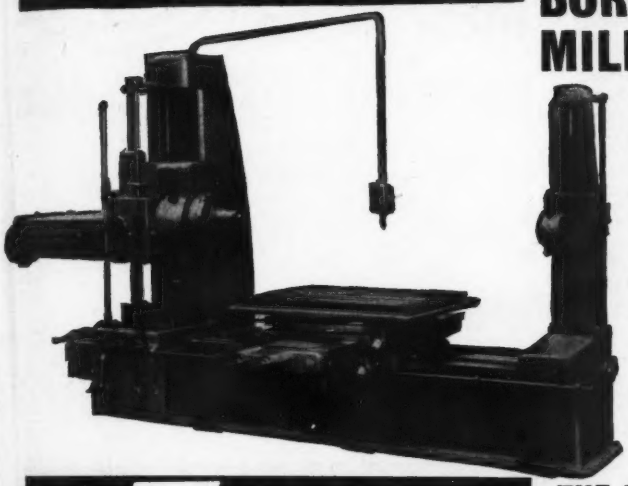
**Powke Lane, Old Hill, Staffs.**

**Telephone: Cradley Heath 66423**

**Telegrams: "Prigard" Cradley Heath**

# UNION

## NEW HORIZONTAL BORING, DRILLING & MILLING MACHINE



**MODEL BFT 63 ($2\frac{1}{2}$")**

COMPLETE WITH FACING HEAD INDEPENDENT OF SPINDLE DRIVE

**IMMEDIATE DELIVERY**

FROM LONDON STOCK

**£4,250**

**TIMES**

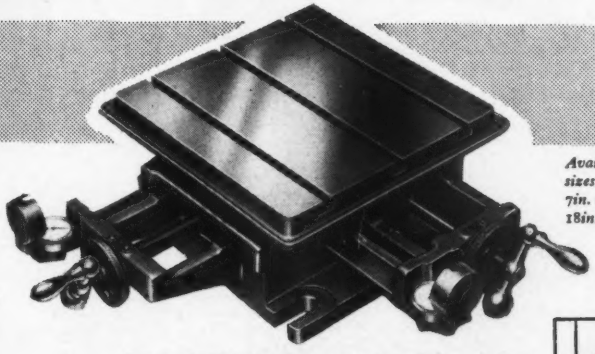
**THE TIMES MACHINERY CO. LTD.**
**POYLE ROAD, COLNBROOK, SLOUGH, BUCKS.**
*Telephone:* COLNBROOK 2442
*Telegrams:* Timachine, Colnbrook, Slough
*Cables:* Timachine, Colnbrook, Slough

H.P 8416

---

**J & S**

## SMALL TOOL



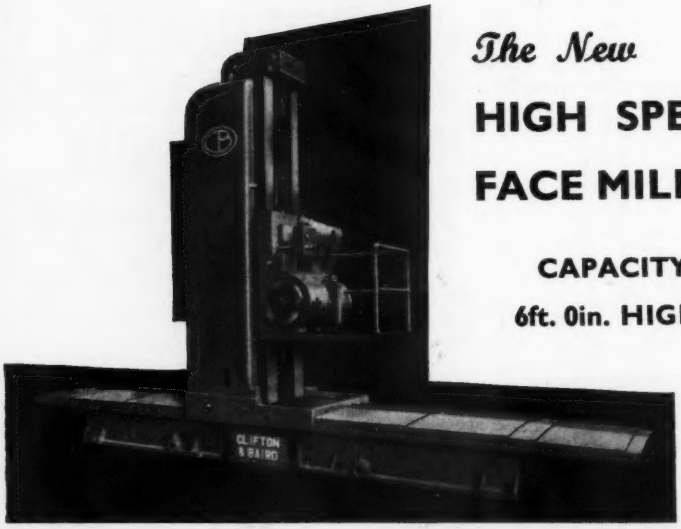
*Available in four sizes from 7in. by 7in. to 18in. by 18in. table size.*

**COMPOUND TABLES**

Designed for light precision machining operations of all descriptions. They are particularly suitable for use on Drilling Machines, enabling Jig Boring operations to be carried out such as hole spacing on small batch work.

**Stock Deliveries from all J & S Small Tool distributing Agents**

**A. A. JONES & SHIPMAN LTD.** Narborough Road South LEICESTER 823222
Telegrams 'CHUCK' Leicester




*The New*

**HIGH SPEED**

**FACE MILLING MACHINE**

**CAPACITY FOR SURFACES**

**6ft. 0in. HIGH by 10ft. 6in. LONG**

*Sole Selling Agents for Home and Overseas:*
**ASSOCIATED BRITISH MACHINE TOOL MAKERS LTD.**
**17, Grosvenor Gardens, London, S.W.1**

# CLIFTON & BAIRD LTD.

Empress Works JOHNSTONE SCOTLAND

---

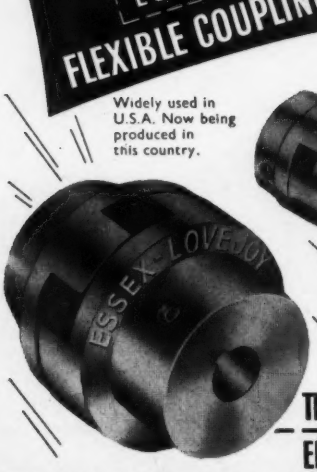
INTRODUCING

**ESSEX LOVEJOY**

**FLEXIBLE COUPLINGS**

.003 h.p. at 100 r.p.m. up to 60 h.p. at 3,600 r.p.m.

Widely used in U.S.A. Now being produced in this country.



COMPACT

EASE OF INSPECTION

NO MAINTENANCE PROBLEMS

SUITABLE FOR PULSATING LOADS

*for full details write for Publication No UK/61/292*

**The MOTOR GEAR and ENGINEERING Co. Ltd**

ESSEX WORKS, CHADWELL HEATH, ESSEX. Seven Kings 7788-3456 (15 Lines)

---

**ESSENTIAL TODAY AND TOMORROW**

The universal drawing device for any size and make of press

**WORSON DIE CUSHIONS LTD**
RABONE LANE WORKS · SMETHWICK · STAFFS.

# *More than 6,000 in use!*

**De Vallière H.130.C**

## PRECISION LATHE

**10¼in. SWING BY 28in. CENTRES**

- SPINDLE SPEEDS 35-2000 r.p.m.
- 2 SPEED 1·6/3 H.P. MOTOR
- "GAMET" PRECISION BEARINGS
- HARDENED AND GROUND GEARS AND BED.

***Prompt Deliveries***

*Write or 'phone* ***NOW!*** *for details*

SOLE U.K. DISTRIBUTORS:

DORMAN MACHINERY SALES LTD

*Telephone: GERRARDS CROSS 4210*
*Telegrams: MACHINERY, GERRARDS CROSS*
**WOODSIDE HILL, CHALFONT ST. PETER, BUCKS.**

# *"Duplex" Direct Drive*

## TOOL POST GRINDERS

Here are two additions to the range of Duplex Tool Post Grinders. They are, in effect, precision grinding spindles with carefully balanced 3 phase rotors mounted thereon. Super precision bearings are used throughout. These units can be used in any position from the horizontal to the vertical for plain, form and cup grinding on lathes, shapers, planers and other machine tools. They are the answer to many an awkward production problem.

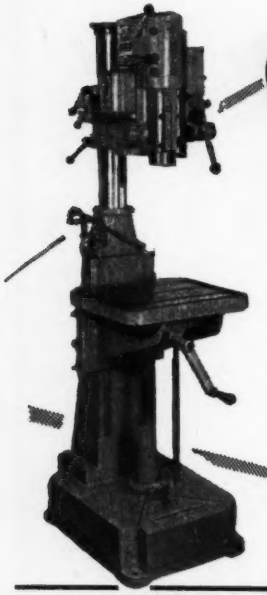
Two sizes are made,

| | | |
|---|---|---|
| D.50 | 7in. by ¾in. | 0.5 H.P. |
| D.60 | 14in. by 1¼in. | 3 H.P. |

3 phase only, any voltage.

Send to-day for our complete Catalogue of Tool Post Grinders.

**DUPLEX ELECTRIC TOOLS LTD.,**
**WOBURN WORKS, PURLEY, SURREY**
***Telephones:* UPLands 3731-8621.**



# GRIMSTON

## High Speed DRILLING MACHINES

Designed for continuous heavy duty, these rigid, powerful and accurate box column machines are available with capacities up to 1¼in. diameter. Choice may be made from a range which includes 4, 8, 12 and 16 speeds, and power feeds can be specified if required. Also available with speeds as low as 7 r.p.m.

Ask for details, quoting Ref. M15.

**GRIMSTON ELECTRIC TOOLS LTD., PROGRESS WAY, CROYDON, SURREY**

PHONE: CROYDON 0131 GRAMS: GRIMTOOL, CROYDON

---

**Mössner**

*Model SSF 950*

**BAND SAWING & BAND FILING MACHINE**

Table 30in. × 32in. Throat depth 37in. Maximum height of material admitted 16in. Cutting speeds, infinitely variable, 50-3,000ft. per min. with high speed range of 7,700ft. for fusion cutting.

**EARLY DELIVERY**

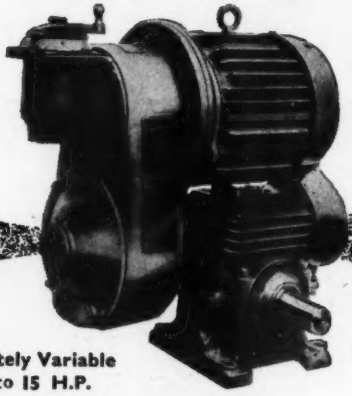
**ELGAR MACHINE TOOL COMPANY LIMITED**

172-178 VICTORIA ROAD · ACTON · LONDON W.3 · Tel: ACORN 5555
Midlands Showroom: 1075 Kingsbury Road, Birmingham, 24
Tel: Castle Bromwich 3781/2

NRP 2613C

---

**RAYNER POWER DRIVES**



Infinitely Variable
¼ to 15 H.P.

***COMPACT PURPOSE-MADE POWER DRIVES ARE OUR BUSINESS***

**PETER RAYNER LTD**

121 WHITEHALL RD LEEDS 12 TELEPHONE: LEEDS 33864/5

to be sure !

GRIFFITHS, GILBART, LLOYD & CO. LTD.
EMPIRE WORKS, PARK ROAD, BIRMINGHAM.

# If you're expanding then you're borrowing...

More permanent capital is what you need—
I C F C can provide long-period loans on fixed terms, and share capital, to businesses in Great Britain.

Set up by the English and Scottish Banks in 1945, **Industrial & Commercial Finance Corporation Ltd** has provided £70 million to nearly 1000 companies.

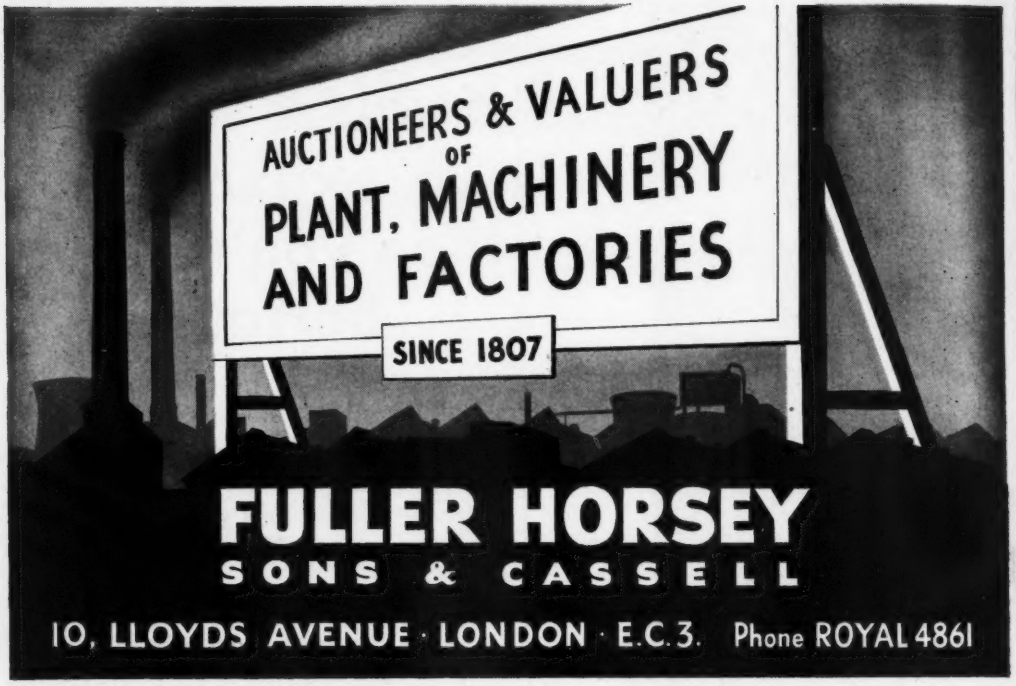
**'CAPITAL FOR BUSINESS'** which explains what the Corporation can do will be sent on request.

ICFC

LONDON
7 Drapers' Gardens, EC2
National 8621/5

and branches in industrial centres.

5 viii



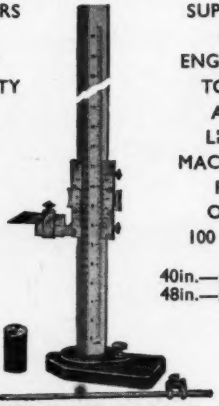

**BUCK & RYAN LTD**

**ESTABLISHED 1824**

VERNIER CALIPERS AND HIGH GAUGES TO 48in. CAPACITY

MICROMETERS GAUGES FINE TOOLS OF ALL DESCRIPTIONS

SUPPLIERS OF ENGINEERS' TOOLS AND LIGHT MACHINERY FOR OVER 100 YEARS



NO. 369
12in.—£41 8s.
18in.—£69.
24in.—£89 14s.

40in.—£172 10s.
48in.—£207

**OUR EXTENSIVE RANGE IS AT YOUR DISPOSAL**

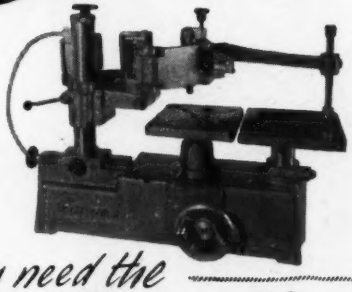
310/312 EUSTON ROAD, LONDON, N.W.1

Telephone: EUSton 4661

AND AT

261 EDGWARE ROAD, LONDON, W.2.

*for* **3D** *Engraving*



*You need the*

**David Dowling**

**MODEL 242** Compact — Sturdy — Large capacity — for fine engraving, mould and die work. Pantographs range from 2:1 8:1

For full details write:
**DAVID DOWLING LTD., Bates Road, Harold Wood, Romford**
**Telephone Ingrebourne 43994/5**

BALL, ROLLER. TAPER
ROLLER & NEEDLE BEARINGS
*IN METRIC SIZES*

DURKOPP

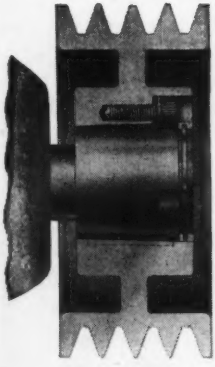
SOLE CONCESSIONNAIRES AND STOCKISTS
FOR UNITED KINGDOM

**FLEXICON LTD**

**Head Office : 72 Vicar Lane BRADFORD Tel: 23941**
**Telex 51243**
**Also at : 70 Foleshill Road, Coventry Tel: 27108**
**61 St. Benedict's St., Norwich Tel: 21795**

---

**WIGGLESWORTH**



*Makers of*
***TEXROPE***
**V-DRIVES**
with
***Magic-Grip***
***BUSHES***
**GROMMET**
**CONSTRUCTION**
**"TEXROPE"**
**BELTS**

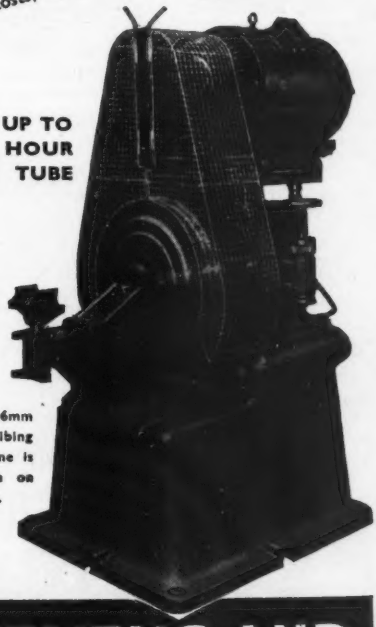
**FRANK WIGGLESWORTH & Co. Ltd.**
**ENGINEERS SHIPLEY**
**YORKSHIRE** *Phone* : **SHIPLEY 53141**

---

*INTRODUCING*
*The* **S&B**
**ROTARY**
**COLD TAGGING MACHINE**

Backed by 30 years' experience in building rotary swagers, the makers have designed this new machine especially for cold tagging steel and non-ferrous tube or bar.
Four dies are mounted in a fixed head and do not rotate. THERE IS NO POSSIBILITY OF THE DIES REVOLVING THE TUBE risking injury to the operator. Advantages are a uniform strong tag, no heating and furnace costs, higher production.

**OUTPUT UP TO 200 PER HOUR ON 2in. TUBE**



A short 16mm film describing this machine is available on application.

**STEVENS AND BULLIVANT Ltd**
WESTERN ROAD BIRMINGHAM 18 ENGLAND

BRITISH **MAUN** MADE

**PLIERS & NIPPERS**

*There's a pair for every need!*

Write for illustrated price list showing our complete range

**MAUN INDUSTRIES LTD., MANSFIELD, NOTTS.**

**Production Tapping and Threading**

**HAGEN & GOEBEL** *MACHINES*

Hand or Pitch Controlled Feed, spindle reversal by opposed friction clutches, vertical head adjustment. Bench or floor models available, also an automatic tapping version.

*Send for data:*

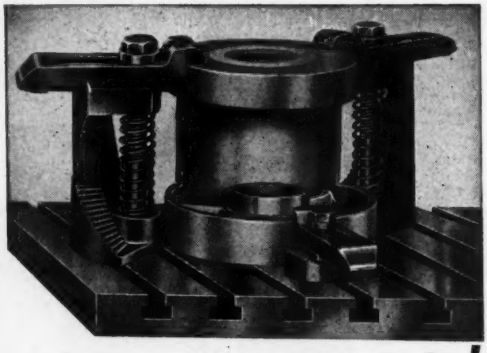
*MODELS FROM 5/64" to 2½" TAPPING CAPACITY*

MODEL HG 23 N 5/64"dia. in steel

**MORTIMER** ENGINEERING Co Ltd.

**MORTIMER HOUSE, Acton Lane, London, N.W.10 Tel. ELGar 3834**

NRP 5157



***For a quick SAFE Grip!***

A range of popular sizes to suit any T slot or clamping height. No loose parts to lose. Each size adjustable for height. Any quantity Ex stock.

ROCKWELL

**HELICAL CLAMPS** BRITISH PATENT

*Write or phone Dept. D/C for leaflet giving prices, sizes and full technical details*

**ROCKWELL** MACHINE TOOL CO. LTD.

**WELSH HARP, EDGWARE ROAD, LONDON, N.W.2. Tel: GLA 0033**

Also at: Birmingham-Telephone Springfield 1134/5
Stockport-Telephone Stockport 5241 · Glasgow-Telephone Merrylee 2822
SC7

**STEEL FABRICATION SPECIALISTS**

**C.F.IDE ENGINEERING LTD.**

- GUILLOTINING
- PROFILING
- ROLLING
- BENDING
- WELDING

*MACHINING—90in. DIA.*

EMPIRE WORKS, 163, CLARENCE STREET, KINGSTON-ON-THAMES Tel: Kingston 6820/6272

**MAKING OR CUTTING**

**GEARS**

**SPUR · BEVEL · WORM · SPIRAL SPROCKETS · RACKS**

**RODGERS BROS. LTD.**

**LONDON GEAR WORKS**
**BLACKWELL ST., BRIXTON RD., S.W.9**
**'PHONE: RELIANCE 2851**

# CLASSIFIED ADVERTISEMENTS

RATES: LINE (All type, except Situations Wanted) Col. width 1⅞ in., 13 lines per inch, min. 4 lines, 1 line averages 6 words, 2/6 per line single insertion (series discounts on request). "SITUATIONS WANTED," 1/11 per line, min. 4 lines.
DISPLAY (with or without blocks) £2 6s. 0d. per inch single column and pro rata (series rates on request).
BOX Nos. 2/- extra. Classified advertisements can be accepted at London Office up to Wednesday preceding following Wednesday's issue.

## CONTRACT WORK

### ••• DESIGNS •••

**NOW!! SPARK EROSION TO THE TRADE**
On Precision Swiss Eleroda Machine
Reduce Press Tool costs
CARBIDE–FORGING–EXTRUSION
IMPACT EXTRUSION DIES
We also modify existing tools

**PRESS TOOLS**
LAMINATIONS—COMBINATION—PROGRESSION, ETC.
**JIGS–FIXTURES**
**PROTOTYPE MACHINING**
Designing—Short Order Work—Sub Assemblies Completely Tooled
JIG BORING AND PRECISION GRINDING
LANDEN (ENGINEERS) LTD.
1a, Aubert Park, Highbury, London, N.5
Phone: CANonbury 1075

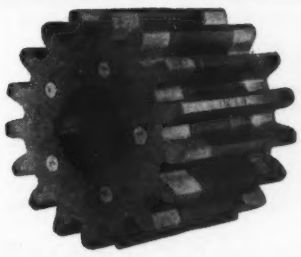
**Precision — Developments —**
Research Engineering capacity available.—G. B. WHALES, LTD., Rear of 123, Old Dover Road, London, S.W.3. Tel.: Greenwich 6625

**Press Tools, Press Work, Capstan**
Turning and General Machining. Components manufactured and assembled to specification.—L. PERSON & SON, 68, Shaftsbury Street, London, N.1. CLE. 7139.

**PRECISION PRODUCTS (ROMFORD) LTD.**
TOOL DESIGNERS AND MANUFACTURERS
*For all your needs*
IN
JIGS · FIXTURES · GAUGES
PRESS TOOLS · FORM TOOLS
AND SPECIAL MACHINES
A.I.D. Approved
Viking Works, London Rd., Romford, Essex. Tel: Romford 61991/2

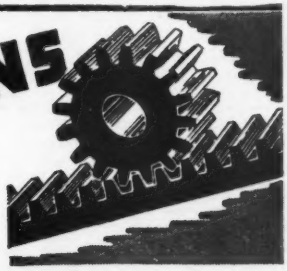
### ••• GEARS •••

33% HIGHER LOAD
is transmitted by our patented GEOLITE pinions and gears than by any other type of non-metallic gear.
(Pat. No. 467726)
*Write for particulars of our gears and blanks.*



MacECHERN & COMPANY LIMITED.
High Street, Chislehurst, Kent. - - - - - - - (IMPerial 1103)

**RACKS & PINIONS**
CUT FROM 4 D.P. TO 50 D.P.
**EAGLE MILLING Co. Ltd.**
114-116, Lancefield Street, LONDON, W.10
Telephone: LADbroke 0725 and 1294



Harvey-Hood

Prototype and production quantities of precision mechanical and electrical engineering to customers' design and requirements

SEND US YOUR ENQUIRIES

**HARVEY-HOOD ENGINEERING CO · LTD**
CONTRACTORS TO THE ADMIRALTY
**63a KINGSTON ROAD · WIMBLEDON · LONDON · S.W.19**
TELEPHONE: LIBERTY 4235-6

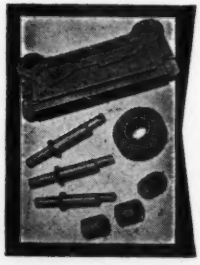
GEARS—PRECISION AND INSTRUMENT MACHINE CUT
Max. capacity 12 D.P. 8in. dia.
Blanks turned and cut.
SETON CREAGHE ENGINEERING LTD.,
TRADING ESTATE, PARK ROYAL ROAD, N.W10
A.I.D. 'Phone: ELGar 3356/7 A.R.B.

**HIGH FREQUENCY**
HEAT TREATMENT CO.
INDUCTION HARDENING, BRAZING & SOLDERING
926, NORTH CIRCULAR RD., LONDON, N.W.2 Tel.: GLAdstone 2542

**GENERAL ENG'G. •• SERVICES ••**

GAUGES (*Not Thread*)—JIGS—FIXTURES, etc,
EXPERIMENTAL & PROTOTYPE WORK, A.I.D. Apd.
**NOVOGAGE** LTD.
(*For quality and precision*)
JIG-BORING, JIG-GRINDING, TOOL ROOM MACHINING
81, Bridge Road, (Nr. HAMPTON COURT STN.) East Molesey, Surrey.
*Tel.:* MOLESEY 2763 *and* 4102

**INDUCTION HARDENING AND BRAZING**
CYANIDE HARDENING, PACK CARBURISING
Shot-blasting
**PRECISION HEATING LTD.**
Island Farm Avenue, West Molesey, Surrey
Phone: MOLesey 4231



**GENERAL HEAT TREATMENT**
CASE HARDENING AND CYANIDE HARDENING ON PRODUCTION BASIS OR SINGLY
SHOT-BLASTING
A.I.D. APPROVED
•
CROYDON TOOL AND CASE HARDENING SPECIALISTS LIMITED
UNION ROAD · WEST CROYDON
*Tel:* THORNTON HEATH 5222

**Luton Engineering Pattern Co.** are prepared to undertake the manufacture of all classes of wood and metal patterns, and accuracy and prompt delivery guaranteed.—Send your enquiries to 89A Princes Street, Luton. 'Phone: 961.

**Plough Grinding—Plate and** Components—Ground Blanks supplied.—BRUNSWICK ENG. Co., 120, Ewell Road, Surbiton, Surrey. ELMbridge 5872.

# Plough Grinding

24 HOUR SERVICE

ANY QUANTITY · MAXIMUM SIZES 60" x 18" RECIPROCATING TABLE
48" DIAMETER ROUND TABLE · HIGH SPEED SERVICE TOOL COMPANY LIMITED
MAPLE ROAD SURBITON SURREY TELEPHONE ELMBRIDGE 1135-6-7

A.I.D. —THE— ELGar 5057/8
**HEAT TREATMENT**
PEOPLE OF LONDON
G.R.M. Heat Treatments Ltd., Coronation Rd., Park Royal, N.W.10

**PLOUGH GRINDING 60 x 18 x 12**
**LARGE TURNING 60in. Dia.**
**HORIZONTAL BORING**
ALAN KEIR LTD.,
NORTH ACTON ROAD, LONDON, N.W.10. ELG 2612

**COVENTRY GRINDERS LTD**
AID, ARB Approved Phone 73344
*Send us your enquiries for*
GAUGES, FORM TOOLS, DIES, PROTOTYPE, COMPONENTS, MANDRELS, CRUSHERS, JIGS, GEAR CUTTING, OPTICAL FORM GRINDING, CENTRELESS, INTERNAL, EXTERNAL, SURFACE.
ALL SIZES OF PRECISION GROUND GAUGEPLATE IN STOCK
1/32 to 18in. WIDE
1/32 to 1 1/4in. THICK
18in. to 48in. LONG.

**Grinding Capacity Available** immediately, 72in. centres, 5in. dia. swing.—F. W. BAGGETT & CO., LTD., 8, Temple Street, Wolverhampton. 'Phone: 25794.

Stonebridge **PLOUGHGRINDING** Service
707 Tudor Estate, Abbey Road, Park Royal, London, N.W.10. ELG. 5353.
GROUND BLANKS SUPPLIED.

ABBEY **HEAT TREATMENTS** LTD.
PLAZA WORKS, HIGH STREET, MERTON, S.W.19
FOR ALL TYPES OF HEAT TREATMENT
A.I.D. WE COLLECT-WE DELIVER D.I.
A.R.E. TELEPHONE: CHErrywood 2291 Arm.

**PROTOTYPES & SPECIAL PURPOSE MACHINES**
REPAIRS AND SALVAGE BY DEPOSITION
*MACHINING, FORGING & FABRICATING*
GEORGE MILLS (ENGINEERS) LTD.
Beckenham, Kent. Tel.: Sydenham 5255

**PROTOTYPE & PRODUCTION**
ELECTRONIC WIRING, COIL WINDING, INSTRUMENTATION & TESTING
SETON CREAGHE ENGINEERING LTD.,
G. W. Trading Estate, Park Royal Road, N.W.10.
A.I.D. ELGAR 3356/7 A.R.B.

*CASTINGS*
**ECLIPSE FOUNDRY**
& ENGINEERING CO. (DUDLEY) LTD.
SEDGLEY ROAD WEST
TIPTON ● STAFFS.
GREY IRON ALUMINIUM NON-FERROUS MAZAK
*Jobbing Casting up to one ton* *Sand & Die Castings* *Gunmetals Phosphor-Bronze* *Pressure Castings*
*Repetition Machine Moulded Work*

A.I.D. and A.R.B. Approved
**IDEAL**
HARDENING CO., LTD.
DAVIS ROAD, CHESSINGTON, SURREY

*HEAT TREATMENT SPECIALISTS HARDENING OF EVERY DESCRIPTION AND SANDBLASTING*
Tel.: ELMBRIDGE 6556

**Let us be your machine shop!**

**COMPLETE FACILITIES**

***plus precision and service second to none!***

Capstan and centre lathe work · Milling—all types
Surface and universal grinding · G-SIP jig boring . . .
*as well as drilling, shaping, honing, centreless grinding, copy turning, thread milling, "Cridan" screw cutting, toolmaking etc., to suit your every need.*

A I D & A R B

*Telephone* · Elmbridge 5333 (3 lines)
MARSDEN & SHIERS LTD · DAVIS ROAD CHESSINGTON · SURREY

**Immediate Capacity Available** castings, non-ferrous, dia. shell moulded, sand, etc. Also machining and stove enamelling.—MILLS ENGINEERING PRODUCTS, LTD., Barnet. 'Phone: Barnet 6744.

**••MACHINING••**

**AUTO TURNED PARTS**
FINE TOLERANCES, MAX. DIA. 1¼in.
INDEX SS & GRIDLEY MULTI AUTOS
THREAD CHASING MANUFACT'RS
ROLLER BOX TOOL HOLDERS
**BENTON ENGINEERING CO., LTD.**
Tonbridge Road, Harold Hill, Essex
Ingrebourne 43864/5.

**Automatic Work up to 1¼in.** Immediate capacity available.
TRUE ENGINEERS, LTD.,
Wharf Lane, Bourne End, Bucks. 'Phone 1316

**THE AVENUE ENGINEERING CO**
GENERAL ENGINEERING CAPACITY
7, Warner Yard, Warner Street,
Mount Pleasant, Clerkenwell, E.C.1
*Telephone: TERminus 2209*

**Automatic Capacity Available up** to ¼in. dia.—HATFIELD AUTOMATICS, 26, Park Street, Hatfield, Herts. Tel.: Hatfield 2159.

**CAPACITY FOR CENTRELESS GRINDING...**
·01in. UP TO 3·50in. DIA. TO PRECISION LIMITS ON 'CINCINNATI' AND OTHER WELL KNOWN MAKES OF MACHINES
**ALLEYNE FOSTER ENG Co LTD**
ESTABLISHED IN 1924
59 South St., Epsom, Surrey, Epsom 2198

**ASHTEAD** FOR **THREAD MILLING** AND **CENTRELESS GRINDING**
**ENGINEERING CO. LTD.**
GROVE RD., ASHTEAD, SURREY
PHONE: ASHTEAD 802
ESTABLISHED 1920
A.I.D. & A.R.B. APPROVED

FOR
**THREAD MILLING**
CONSULT
**BROWN'S ENGINEERING WORKS**
**Dudden Hill Lane, N.W.10.**
**'phone: Dollis Hill 7941**

**AUTO CAPACITY**
**6in. and 4in. Chucking.**
**7/16in.-2in. dia. Bar, A.I.D., A.R.B. approved.**
**HUNTLEY & SPARKS LTD**
James Estate, Western Road, Mitcham, Surrey

**Immediate Capacity Available** on single spindle Automatics up to 1in. dia.—M & C. AUTOMATICS, Wood Street, Guildford, Surrey. Telephone: Normandy 3240.

**Immediate Capacity Available** on Single Spindle Automatics up to 1¼in.—HARRADINE AUTOMATICS, Forge Works, Pleasant Place, Hersham, Surrey. 'Phone W.-on-T. 24914.

**All Kinds of Firms Send All** Sorts of Machining to TIMS ENG. CO., LTD., Horizontal Boring, Centre Lathe, Capstan and Combination Turret Turning. Vertical and Horizontal Milling. Grinding. Jigs, Tools, Fixtures, Moulds. Welding Fabrications. Special machines. 1 off to batch production.—50, Bard Road, Latimer Road, W.10. LAD. 7711

Please make a note of our telephone number:—**DUDLEY 55103-4.**
**AUTO SCREW PRODUCTS LTD.**
**Castle Works, Tipton Road, Dudley, Worcs.,**
have capacity available for automatic screw machine work, capstan milling, drilling and presswork. Repetition products for all industries made to customers' specifications in any quantity. Nuts, Bolts, Screws, General turning, tool design and manufacture.

**Thread Milling for the Trade** up to 6in. O.D. and 5in. I.D. Any thread any quantity. Keen prices for long runs. Satisfaction guaranteed.
UNICORN PRODUCTS, LTD.,
119-121, Stanstead Road, Forest Hill, London S.E.23. Telephone: Forest Hill 7688 (3 lines).

**Automatic Capacity Available** Index single spindle autos, up to 1¼in. dia. —PRESS & PRODUCTION MACHINE TOOLS, LTD., 97a, High Street, Teddington. TED Lock 4032.

**CAM cutting**

Experimental Camshafts and Models.

If you are interested in having your cams redesigned, to give increased speeds, we have a technical leaflet on this subject which may be of interest to your Design Department.

**zephyr cams** *ltd.*

*Euston 7624/5* *24/32 Euston Buildings, Gower St., N.W.1*

**DELANCEY**
**TOOL & ENGINEERING WORKS**
A.I.D., ADMIRALTY & WAR OFFICE APPROVED LTD.

**CAM CUTTING & GENERAL MACHINING**
FITTING & EXPERIMENTAL WORK
PROMPT SERVICE
DELANCEY ST. LONDON, N.W.1
Telephone: GULLIVER 3448

**LEYTON**
**ENG CO LTD**
**EST: 1929**
**BEECHCROFT ROAD**
Tel: WAN 5540 & 3343
Telegrams: LEQUIP LONDON E18
Cables: LEQUIP LONDON

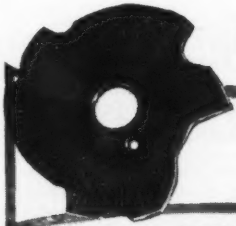
Aircraft and engine servicing tools
Machine tooling equipment
Precision work
Machine parts
Turning, milling, hardening, grinding
Complete machine-unit assemblies

SOUTH WOODFORD
LONDON E.18

**Centreless Grinding Capacity.** Infeed Plunge ⅛in. to 4in.—CHISWICK ENG'G, LTD., Pluckington Place, Southall, Middx. Tel.: Southall 2247.

**Spur Gear and Sprocket Cutting** from blanks supplied or machined complete. 'Phone: EUSton 1354.
TURNER BROS., 10, Pratt Mews, Camden Town, N.W.1.

MACHINING
**W. G. MARSDEN ENG. LTD**
CAPSTANS TURRET LATHES AUTOS
LATHES MILLS DRILLS GRINDERS
COMPONENTS & ASSEMBLY PRODUCTION
FULL MACHINE SHOP SERVICE
JIGS TOOLS GAUGES PRESS TOOLS
30 FIFE ROAD - KINGSTON - ON - THAMES
KINGSTON 6112
CAPACITY



**CAMS**
FOR ALL SINGLE SPINDLE AUTOS
APPROX. **48** HOURS DELIVERY
**EDWARDS BROS.**
51 GEORGE LANE, SOUTH WOODFORD, E.18 TEL: WANSTEAD 1939

Classified Advertisements (*CONTRACT WORK, contd.*)

**PRECISION TURNED PARTS**
D.G.I. and A.R.B. APPROVED
AUTO & CAPSTAN QUANTITIES
*Send your specification to:*
**AYLESBURY TURNED PARTS (True Screws) Limited**
Britannia St., AYLESBURY, Bucks.
Telephone: AYLESBURY 2424 (3 lines)

**Automatic and Capstan** Capacity Available up to 2in. dia.—WILLIS ENGINEERING, 65, High Street, Hampton Hill, Middlesex. Molesey 4273.

**Automatic Capacity Available on** single spindle machines.—BARMAC ENGINEERING COMPANY, Bridge Works, Iver Lane, Cowley, Middlesex. Telephone: Uxbridge 38839.

**Planing Capacity, Heavy or Light** Turning up to 5ft. diameter. Special machines to customers' design. F. ATKINSON & SONS (LONDON), LTD., 65, King's Cross Road, W.C.1. Terminus 4050

**Capacity Turning, Capstan** milling, drilling, die and tool making. —MILLS ENGINEERING PRODUCTS, LTD., Barnet. Tel.: BARnet 6744.

**Automatic Capacity Available,** Index single spindle Autos. up to 2¾in. diameter. Centreless Grinding Capacity ¼in. to 5in. diameter.
JAN PRECISION SCREWS, 629, Spur Road, Feltham, Middlesex. Telephone: Feltham 4282/3.

**Multi-spindle and Single-spindle** Auto Turning up to 2in. bar capacity. capstan turning from the bar up to 2¼in. dia, chuck work up to 14in. dia., thread milling, milling, shaping, drilling, etc. capacity available. Any tolerance and quantity. Satisfaction absolutely guaranteed.—UNICORN PRODUCTS, LTD., 119-121, Stanstead Road, Forest Hill, S.E.23. 'Phone: FORest Hill 7688 (8 lines).

**FINE LIMIT GRINDING**
MILLING, TURNING, DRILLING.
Complete Service Offered.
**SETON CREAGHE ENGINEERING LTD.,**
Trading Estate, Park Royal Road, N.W.10
A.I.D. ELGar 3356/7 A.R.B.

**Automatic Capacity Available.** Index Autos, up to 2¼in. diameter. Chucking up to 5in.
JAMES HARRINGTON, Magda Works, Walton-on-Thames. Tel.: 26099 & 25614.

**Capstan Capacity Immediately** Available, 8 BA-1¼in. Steel or Brass Large stocks of raw materials.
SACRON, LTD., 7, Chiswick High Road, W.4. Tel.: CHIswick 3595.

**High Precision Grinding of** Tungsten Carbide and Steel Tools. Accurate profile grinding and progression tools a speciality.—S.T. LTD., 22-26, Upper Mulgrave Road, Cheam, Surrey. 'Phone: Vigilant 0074/5.

**Capstan Capacity Immediately** available 10 BA to 1¼in. B.M.S. Stainless, Brass, etc. All materials in stock.—CHISWICK ENG., LTD., Pluckington Place, Southall, Middlesex. Tel.: Southall 2247.

**CENTRELESS GRINDING SPECIALISTS**
**BAR GRINDING**
$\frac{1}{16}$in. TO 5in. DIA. UP TO 15ft. LONG
all types of infeed, through and plunge
A.I.D. APPROVED
IMMEDIATE CAPACITY ON CAPSTAN, MILLING CENTRE LATHES, AUTO AND ALL TYPES OF GRINDING
**REDCAR ENGINEERING CO. LTD.** *Tel:* POPESGROVE 1005/6/7
8 STATION YARD GROSVENOR RD TWICKENHAM MIDDX

**AIRCRAFT UNIT ENGINEERING CO.**
*Invite quotations for machining capacities*
A.I.D., A.R.B., AND LIMITED A.R.B. DESIGN APPROVAL
***Turning, Capstan and Centre Lathe. Milling, Universal, Profile. Grinding, universal, surface, centreless, etc. (up to 86in. x 15in. dia. Plain Cylindrical)***
***Screw Cutting (Cridan machines) and Thread Milling***
***General Assembly Work Modern plant producing High Quality work***
**18-19, Greenhill Parade, Great North Road, New Barnet, Herts.**
**Telephone: BARnet 6471 and 7479**

**Thread - Grinding.** SCREW THREADING TOOLS, LTD., 226, Middlewood Road, Sheffield, 6.

**Automatic Capacity Available.** B. & S. up to 1¼in. dia. C.B. AUTOMATICS, Bridge Works, Iver Lane, Cowley, Middlesex. Tel.: Uxbridge 33428.

**Automatic Capacity on Single** spindle machines. Capstan and turret capacity. Bar or chucking. Cylindrical Grinding up to 54in. × 10in.—MACKENZIE REEVES, LTD., Frederick Street, London, E.15. Telephone: MARyland 4017.

**WE MAKE TANKS, FRAMES, DUCTS, INSTRUMENT PANELS AND CHIMNEYS**
Let us have your enquiries for welded fabrications large or small. And we can press 200 Tons, guillotine bend and cylindrical roll ¼in. plate.
**SHELMERDINE & MULLEY LIMITED**
EDGWARE ROAD, CRICKLEWOOD N.W.2.
Tel: GLAdstone 7677-8.

**Gear Cutting, Auto Turret, Capstan and Centre Lathe Turning, Milling, Planing, Hardening and Grinding, Profile Cutting and Welding.**
**SMITH & NETHERWOOD, LTD.**
**Taopard Road, Quarmby, HUDDERSFIELD.**
**Phone: MILNSBRIDGE 1866.**

**Automatic Capacity Available on** Index single spindle autos, up to 2¼in. dia. —ARTHURS ENGINEERING, LTD., Hersham Trading Estate, Molesey Road, Hersham, Surrey 'Phone: Walton-on-Thames 21277.

**Automatic Capacity Imme-** diately available. Swiss type machines up to ¾in. dia.—E. V. IRONS, Clovelly Works, 272, Acton Lane, Chiswick, W.4. CHIswick 1007

**Precision Turned Parts, Auto** ¾in., Capstan 2in. Milling, Grinding, Heat Treatment, etc. A.I.D., A.R.B.
S.M.E. LTD., Steyning, Sussex 'Phone Steyning 2228.

**E. R. LATTIMER LTD** AID & ARB APPROVED
*Offer complete Service for*
PRECISION PROFILE MILLING, JIG BORING
CENTRELESS, SURFACE AND UNIVERSAL GRINDING
LIGHT TO MEDIUM COMPONENT MANUFACTURE
TOOL DESIGN & MANUFACTURE
SMALL ASSEMBLIES, DIE & MOULD MANUFACTURE
SMALL PRESSURE DIE CASTING IN MAZAK ALLOY TO BS 1004
SUPER PRECISION HYDRAULIC COMPONENTS AND ASSEMBLIES
FOR WHICH WE HAVE HYDRAULIC TESTING EQUIPMENT
SHAKESPEARE STREET SOUTHPORT
Phone: 57696/7

Classified Advertisements (*CONTRACT WORK, contd.*)

## •PRESS WORK•

**Pressings in all Metals Up To** 60 tons. Press tools manufactured in our own toolroom. Light assemblies. Domestic Electrical and Mechanical. All finishes. A.I.D. and A.R.B. approved. Advice and estimates given free. Inquiries to:—

METAL COMPONENTS, LTD.,
Dolphin Road, Shoreham-by-Sea, Sussex.
'Phone: Shoreham-by-Sea 2224/5.

**Press Productions**

Pressings on auto or hand fed presses. Immediate capacity up to 40 tons. Production from our, or customer's tooling. A.I.D. approved.—Summersby Road, Highgate, N.6. TUDor 9851.

**Pressings and Stampings, Ltd.,** Eccleston Road, West Ealing, W.12. Presswork up to 130 tons. Double action deep drawing guillotine 8ft. by 10 s.w.g. Spot welding. Assembly. Toolmaking and electroplating.—'Phone: Ealing 3667-8.

**METAL SPINNINGS**
IMMEDIATE CAPACITY FOR METAL Spinnings, Sheet Metal Work, Welding. A.I.D. Approved M.O.S. Ref. 8026/57
HIGHBURY METAL SPINNING CO. (1955) LTD.
33 HIGHBURY PLACE, N.5. CANonbury 2906

**TREVENA & GLOVER LTD**
*Specialists in Intricate Presswork*
309-312 ICKNIELD STREET
BIRMINGHAM 18.
Quality contacts for the Electrical Industry.
Small and Medium Presswork in all ferrous and non-ferrous metals.
*Telephone: B'ham Northern 0258.*
ON AIR MINISTRY LIST
CONTRACTORS TO THE G.P.O.

**NAISH BROS. & CO. LTD.,**
KNAPPS LANE, ST. GEORGE,
BRISTOL 5 Tel: 657204/5
PRESS TOOLS
FIXTURES
SPECIAL MACHINES
PRESSINGS
GEARS

**SUB-MINIATURE PRESSINGS**
and multi-stage precision presswork in all materials
*PROMPT DELIVERIES*
G. A. PRECISION PRODUCTS LTD.
No. 2 Factory Darkes Lane, Potters Bar, Middlesex
*Potters Bar 6895.*

**RELIABLE SERVICE · COMPETITIVE PRICES · A.I.D. APPROVED**

# PRESS WORK

**INCLUDING DEEP DRAWING, WELDING AND SUB-ASSEMBLY**

***to any tolerance, shape or quantity***

**ECONOMIC STAMPINGS LTD., DISRAELI ST. LEICESTER Tel: 32233**

A.I.D., C.I.A., A.R.B., APPROVED

WELDING & FABRICATIONS

# PRESSINGS

PRESS CAPACITY UP TO 1000 TONS
ALL MATERIALS

POLARCOLD LTD.,
CONGLETON · CHESHIRE TEL. 2401/3

## ••TOOLMAKING••

**Kellering and Cam Profiling** capacity up to 8ft. by 6ft. or 6ft. diameter.

ARMYTAGE BROS. (KNOTTINGLEY), LTD.,
The Foundry, Knottingley, Yorkshire.
Telephone: Knottingley 2743/4.

EST° 1889
**R. STEPHENS & SON LTD**
PRESS TOOLS · JIGS
FIXTURES · MOULDS
GAUGES · DESIGNS
115 CHURCH ROAD
UPPER NORWOOD
LONDON S.E.19
PHONE LIVINGSTONE 2265-6

SIGN OF
# KEMWORTHY
A GOOD TOOL

**Send Us Your Enquiries**

'PHONE: LIBERTY 5203.

THE KEMWORTHY JIG & PRESS TOOL COMPANY LTD.,
NELSON WORKS, LYON ROAD, MERTON, LONDON, S.W.19.

*When answering advertisements kindly mention MACHINERY.*

**PRECISION PRESSWORK**
*Own Toolroom*
Double action deep drawing
Double roll feeds
**HOLLY ENGINEERING (Drayton) LTD**
COLHAM AVENUE · YIEWSLEY · MIDDLESEX
*Telephone:* West Drayton 2670

**GROSVENOR WORKS (Holloway) LTD.**
Station Road, Tottenham Hale, N.17
*Telephones: TOTtenham 7782/3*
**PRECISION ENGINEERS**
Press Tools. Metal Stampings.
Special Purpose Machines.
Precision Machined Components.
Jig Boring.

**JIG BORING**
JIGS - FIXTURES
PRESS TOOLS
PROTOTYPE MACHINING
**WEST GREEN TOOL CO.**
KINGS ROAD · WOOD GREEN · N.22
*Telephone:* BOWES PARK 5144

**QUALITY TOOLS**
PRESS TOOLS • JIGS • FIXTURES
SPECIAL PURPOSE MACHINES
MACHINING
**MAYSMITH**
ENGINEERING CO. LTD.
290a High Road, Willesden, N.W.10
A.I.D. Tel: WIL 6688/9 A.R.B.

**JIG BORING**
On SIP JIG BORERS
**EDMONTON TOOL & ENG. CO. LTD**
141, HERTFORD ROAD, EDMONTON N.9
TELEPHONE: EDMONTON 4412/3
SPURS, SPIRALS, BEVELS, WORMS & WORMWHEELS
**GEAR CUTTING**

**MACDOWALL**
JIGS, FIXTURES
PRESS TOOLS & GAUGES
PRECISION ENGINEERS
SPECIAL MACHINERY
MACDOWALL EQUIPMENT COMPANY LIMITED
NORTH STREET
ROMFORD, ESSEX
**ROMFORD 61981**

**KEMP**
**PRECISION TOOLING LTD**
37 JUNCTION ROAD,
CROYDON, SURREY
*TELEPHONE: CROYDON 5658*
PRESS TOOLS, JIGS
GAUGES, MOULDS
SPECIAL PURPOSE MACHINES
PROFILE GRINDING
PRECISION COMPONENT PRODUCTION
JIG BORING

HIGH QUALITY
**PRESS TOOLS**
MULTI-OPERATION TOOL
•SPECIALISTS•
STAMPINGS IN ALL MATERIALS
FIXTURES - JIGS - MOULDS
SPECIAL PURPOSE MACHINES
**W. T. Atkin (TOTT) Ltd.**
178 ST. ANN'S ROAD, LONDON N.15
Telephone: STAMFORD HILL 6686 7

**Tungsten Carbide Tool**
Manufacturers of standard and special form tools in high speed steel and tungsten carbide.
Our range includes reamers, cutters, workrest blades and wear-resistant parts.
Carbide supplied to customers' specifications and express service given for emergency tooling.
DIAGRIT GRINDING CO., LTD.,
Station Road, Staplehurst, Tonbridge, Kent.
'Phone: Staplehurst 449.

**Press Tools, Jigs and Fixtures.**
Light Pressings up to 40 tons.—SPENCE TOOLS LTD., 361a, Oxford Avenue, Trading Estate, Slough. Tel.: Slough 22394.

# SPECIALITIES

## LAPPEX

micronised
**LAPPING COMPOUND**
**for machine and hand use**
*Gives a superfine scratch-free Mirror finish on steels, non-ferrous metals and many plastics.*
**Lappex 7/6 tube 20grms**
**Lappex Vehicle 3/- tin 4ozs**
THE GENERAL ENGINEERS SUPPLY CO (1937) LTD
555 High Rd. Leytonstone E.11
Ley 6677 & 5685

---

*For PRECISION*
**BELLEVILLE WASHERS**
Supplier
INDUSTRIAL TRADING CO. LTD.
P.O. BOX 51 WORCESTER

Other Products Include:
Annular Grip Springs
Electro-magnetic Tooth Clutches
Laminated Shims
Lock Washers (standard)
Wiper Rings

---

## DONOVAN
**FOR THE**
**MACHINE TOOL BUYER**
**WHO REQUIRES**
PLASTIC INSULATION CABLES, P.V.C. COVERED & PLAIN FLEXIBLE CONDUIT, B.S.A. ACME SNAP-LOCK LIMIT SWITCHES & MICRO LIMIT SWITCHES AMMETERS, H.R.C. FUSE CARTRIDGES & SLYDLOCK FUSES, FLUSH MOUNTING ISOLATING SWITCHES, BILL & M.E.M. SWITCHGEAR.
**The Donovan Electrical Co. Ltd.,**
**(Wholesaling Division)**
**Granville Street, Birmingham, 1**

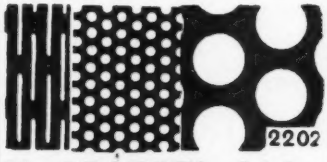
---

## LISTERS SOFT JAWS
**PRATT, COVENTRY**
**AMERICAN & CONTINENTAL**
*Please send your enquiries to:*
**SOLE AGENTS LONDON & SOUTH**
**W. J. L. (MACHINERY) LTD.**
DACRE HOUSE, DEAN FARRAR STREET, LONDON, S.W.1. *Tel: WHitehall 2018*

---

## MACHINE ENGRAVING CAPACITY
**FIRST CLASS WORK PROMPT DELIVERY**
**also all types Dials, Nameplates, Plastic Motifs, Panels, Scales, etc.**
**FOR SERVICE RING CHING** Boxmoor 6400/1
**RICHARD CHING & SON LTD., Duxons Turn, Haylands Ave. Hemel Hempstead, Herts.**

---




## H. GRAEPEL, Ltd.
**KINSALE, CO. CORK 12**
*MAKERS OF PERFORATED METAL*

---

**ROTARY COMPRESSORS & EXHAUSTERS**
*Manufactured by*
**THE HAMMOND ENG. CO., LTD.,**
**Chase Side, Enfield, Middx.**
**Telephone: ENF. 1323 (3 lines)**

---

## 'BRONTE'
*BRONZE SEATED*
**PIPE UNIONS**
*The Popular Steam Joint*
**WALTER SLINGSBY & CO., LTD.**
**WASK WORKS · KEIGHLEY**

---

**Machine Engraved Feed Dials,** Scales, Mould Tools, Nameplates, Labels, etc., in Metal and Plastic. Excellent delivery.—O. H. KAMPF & CO., 15a, Market Square, Crewkerne, Somerset. 'Phone: Crewkerne 709.

---

**The "Coxeter" Revolving** Centre from 70s. All sizes from stock.—REVOLVING CENTRES, LTD., Oxford.

---

## TOOL CHESTS
**F. C. NIELSEN & SON**
31-45 Cursach St., LONDON, N.W.1. - EUS 2054

---

**TIME RECORDERS—Sales—** Rental Service: Tel. Hop 2239. TIME RECORDER SUPPLY & MAINTENANCE CO., LTD., 157/159, Borough High Street, London, S.E.1.

---

# BALL & ROLLER BEARINGS

***THE WORLD'S LARGEST SELECTION OF***
**BRITISH, AMERICAN AND CONTINENTAL BEARINGS IN ALL TYPES AND SIZES**
***IMMEDIATE DELIVERY FROM STOCK · KEENEST PRICES***

## CLAUDE RYE BEARINGS
895-921 FULHAM ROAD · LONDON · SW6
PHONE: RENOWN 3174 (Exc. 241) · TELEX 23453 · CABLES: RYE BEARINGS, LONDON
Slough Branch: 30 BATH ROAD, SLOUGH Phone: SLOUGH 22351
Kingston Branch: 88 LONDON ROAD, KINGSTON Phone: KINGSTON 5757 & 4142

Classified Advertisements (*SPECIALITIES, contd.*)

**Universal Ball Bearing Co.**
111-115 Hammersmith Grove, London, W.6
FACTORS MANUFACTURERS AND REPAIRERS
Phone: Riverside 3261-2-3-4
Grams: "Universal Bearing Hammersmith"

**ABOUT AMMUNITION BOXES**
THOUSANDS OF STEEL AND WOODEN BOXES OF ALL SIZES
*Ideal for all Types of Packing & Storage purposes.*
For particulars and prices apply:—
**O.K. TRADING (B'HAM FACTORS) LTD.**
78-84, MOAT LANE, B'HAM 26
STEchford 4351/2 P.B.X.

H.S.S. GROUND FORM
**THREAD MILLING HOBS**
*ALSO* **SPECIAL TAPS**
PHONE: 2941 KEIGHLEY
**PERCY C. HOLMES (ENGS) LTD.**
MARKET ST., KEIGHLEY, YORKS

# ANNOUNCEMENTS

## •WORK TO PLACE•

**Large Company Making Special** machinery seeks capacity for complete manufacture and building of their machines.—Please write in the first place with full details of company, list of plant, and giving details of normal business, to BOX C796, MACHINERY, Clifton House, Euston Road, N.W.1.

**Large Engineering Company in** London wishes to sub-contract work in the following capacities. Medium Capstan, Turret Lathes, Vertical and Horizontal Boring, Medium and Large Planing, Milling, Radial Drilling, Grinding, Centre Lathes, etc.—Please send particulars of plant to BOX C715, MACHINERY, Clifton House, Euston Road, N.W.1.

### BUSINESS OPPORTUNITIES

**Electrical Controls. Small Mid-** land works prepared to manufacture specialist equipment to approved designs in limited quantities.—Reply in confidence to BOX C895, MACHINERY, Clifton House, Euston Road, N.W.1.

### PHOTOGRAPHY

**Miles & Kaye, Ltd., 102, South-** ampton Row, London, W.C.1. Holborn 6858. Specialists in commercial and industrial photography for over 60 years. All branches of photographic work undertaken.

**Photographs by MACHINERY** set the standard in engineering publicity. Our studio is one of the best equipped in the country. Ideal for really good photography of tools, attachments and portable equipment. Mobile units available for taking photographs in black and white or in natural colour in your own or your customers' works. Specimens of work submitted on request.—Full particulars from the SERVICE MANAGER, MACHINERY PUBLISHING COMPANY, LTD., National House, West Street, Brighton, 1.

### PACKING AND SHIPPING

**R. & J. PARK, LTD., Dominion** Works, Chiswick, England. Export packers, shippers, and forwarding agents, specialists in packing heavy machinery.

### AGENCIES WANTED

**The London Tool (Small Tools)** Co., Ltd., screw threading specialists for 40 years, are prepared to accept agency for any tools, instruments or equipment ancillary to this field.—Write to SALES DIRECTOR, at Fulwood House, Fulwood Place, High Holborn, W.C.1.

### PATENTS—TRADE MARKS

**Kings Patent Agency, Ltd.**
E. T. KING, A.M.Inst.E.,
Registered Patent Agent.
146A, Queen Victoria Street, London, E.C.4.
City 6161 Booklet on Request.

**The Proprietors of British** Patent No. 853165 for "Vee-Lock" Quick action production fixture, also Patent No. 815360 for "Tap-True" tapping and reaming Guide, desire to enter into negotiations with a firm or firms for the sale of the Patents or for the grant of licences thereunder.—Further particulars may be obtained from D. DESMOND & SONS, Braeside Works, Teevan Road, Addiscombe, Croydon, Surrey. Telephone: Add. 1773.

**The Proprietors of British** Patents Nos. 791515 for "Apparatus for Filtering Liquids" and 791516 for "Method and Apparatus for Filtering Liquids," desire to enter into negotiations with a firm or firms for the sale of the patents or for the grant of licences thereunder. Further particulars may be obtained from Marks & Clerk, 57 and 58, Lincoln's Inn Fields London, W.C.2.

### MATERIALS FOR SALE

**Storage Bins, 18in. × 10in. ×** 5in. deep 3s., Pressed Steel Shelves 4ft. 6½in. × 9½in. × 16 gauge 2s. 6d. Good condition.—LOWTON METALS, LTD., Sandy Lane, Lowton St. Mary's, Leigh 71441/2

**E. Stephens & Sons Ltd., Bath** Street, London, E.C.4. CLE. 1731. Tubes Rounds, Flats, Hex., cut to size. Quick delivery.

### MATERIALS WANTED

**Ball and Roller Bearings, etc.** Wanted. Also surplus goods especially hand tools, of all descriptions.—R. PORDES, 138, New Cavendish Street, London, W.1. MUSeum 5250.

**£200,000**
AVAILABLE FOR THE PURCHASE OF
NEW BALL & ROLLER
**BEARINGS**
OF ALL TYPES & SIZES
BY BRITAINS BIGGEST BUYERS
**CLAUDE RYE BEARINGS**
895-921 FULHAM RD. LONDON SW6
RENOWN 6174 (Ext 24). TELEX 2-3453

# PLANT WANTED

**WE WILL PURCHASE** Modern quality machine tools for cash. Whole plants or individual items. Full details to:—
HARRY KIRK ENGINEERING, LTD.,
Machine Tool Division,
Brandon Road Works,
Brandon Road, Coventry.
Telephone: Walsgrave-on-Sowe 2253/6.

**Reasonably Modern Double** column Planing Machine, approximately 16ft. × 5ft. × 5ft.—BARRON & CROWTHER LTD., Eastleigh, Hants. 'Phone: Eastleigh 2701.

**Reed Prentice V-2 Milling Ma-** chine required, state price, condition, serial number.—C.I.C. ENG. LTD., Excalibur Works, Shepton Mallet, Somerset.

**Lathes, Swing min. 16in. Heavy** duty precision. Must be first class and fully equipped. Monarch, Dean Smith, or similar. No Dealers.—PATON ENGINEERING LTD., The Vineyard, Richmond, Surrey. 'Phone: RICHmond 4645.

**5in. Spindle Floor Type Boring** Machine, fitted with facing head, motorised for 400-440/3/50 cycles.—BOX C912, MACHINERY, Clifton House, Euston Road, N.W.1.

*When answering advertisements kindly mention MACHINERY.*

Classified Advertisements (PLANT WANTED, contd.)

**Wanted. All Types and Sizes** Herbert, Coventry, Landmatic, Landex and Lanco Dieheads and Chasers. Also spare parts.—WEST MIDLAND EQUIPMENT CO. (STOURBRIDGE), LTD., Rufford Road, Stourbridge, Worcs. Stourbridge 6187.

**Fork Lift Truck Required. Offers** to:—
SCOTT ENGINEERING (BOURNEMOUTH)' LTD.,
68, Old Wareham Road, Parkstone, Poole, Dorset. Parkstone 4455/6.

**B.G. MACHINERY, LTD.,** Montgomery Street, Sparkbrook, Birmingham, 11, will pay good prices for Machine Tools of first-class make and in good condition.—'Phone: VICtoria 2351/9.

**Wanted, Brown & Sharpe and** C.V.A.8 Single Spindle Automatic.—MELBOURNE ENGINEERING CO., LTD., Melbourne, Derbyshire. 'Phone: Melbourne 282.

**WANTED**

**Good Class Used MACHINE TOOLS**

Write or phone

**STANCROFT LTD.**
BEDWORTH ROAD, COVENTRY
Telephone: Coventry 88072

**WANTED**
All types of modern
**MACHINE TOOLS**
Chipping Sodbury 3311
NEWMAN INDUSTRIES LIMITED
YATE · BRISTOL

**DOUGLAS**
**OF HIGH WYCOMBE**

- ★ We would be pleased to purchase your Surplus Modern Machine Tools.
- ★ Generous offers made for Latest Style Machines.
- ★ Inspection Arranged at Once.
- ★ Britan Repetition Lathes a Speciality.
- ★ Cash or Part Exchange Basis.

**A. DOUGLAS CO. LTD.**
LINCOLN ROAD,
HIGH WYCOMBE,
BUCKS.
Tel: H.W. 4390 (5 lines).

**WANTED!**
**USED MACHINE TOOLS**
We offer generous prices for your plant or accept in part exchange for modern equipment

**E·H·JONES**
(MACHINE TOOLS) LTD
48, HIGH STREET, EDGWARE
Telephone: EDGware 4488
Midland 5593 - Birmingham

**Albert Edwards**
**(MACHINERY) LTD.,**
79/89 PENTONVILLE ROAD
LONDON, N.1.
Telephone: TERminus 0167/8/9

We are buyers of good modern machine tools

**Longford Machine Tool Co., Ltd.,** Longford Road, Coventry, will pay good prices for any type of machine tool which is in good condition, and is of first class make. Only machines motorised 400/3/50 will be considered. —Write or 'phone Coventry 87481/2.

**WANTED!**
*GOOD CLASS MACHINE TOOLS POWER PRESSES & SHEET METAL MACHINERY*
EDWIN MILLEN & SONS LTD.
70 Clerkenwell Road, London E.C. 1
'Phone: CLErkenwell 6064

**A. LAWRENCE & CO. (MACHINE TOOLS) LTD.**
will be pleased to purchase your surplus Modern Machine Tools either on a cash or part exchange basis. Ask our representative to call and inspect.
Welsh Harp, Edgware Road, London, N.W.2
Telephone: GLAdstone 0033

**HIGHEST PRICES PAID FOR.....**
MACHINE TOOLS • PRESSES • PLATE & SHEET METAL WORKING MACHINERY • TIN BOX MAKING MACHINERY • WOODWORKING MACHINERY
*Outright purchase or in part exchange*
**F. J. Edwards Ltd**
EDWARDS HOUSE, 359-361, EUSTON RD., LONDON, N.W.1
Telephone: Euston 5000 Telex 24264
41 WATER STREET, BIRMINGHAM 3 Telephone CENtral 7606-8

**FRYE** MACHINE TOOL COMPANY LIMITED

***arrange immediate inspection of good class plant***

POYLE ROAD · COLNBROOK · SLOUGH · BUCKS · *COLNBROOK 2442/3/4*

NEAR TO LONDON AIRPORT

---

***WANTED FOR EXPORT***

**ALL TYPES OF MACHINE TOOLS OF GERMAN MANUFACTURE**

Good prices will be offered after inspection

**BOX C.909, MACHINERY, Clifton House, Euston Rd., N.W.1**

---

**WANTED GOOD MACHINE TOOLS**

Offer your Surplus Tools to us.

We pay a good price.

**M. WARD**

(MACHINE TOOLS) LTD.
1, KILBURN HIGH ROAD,
LONDON, N.W.6.

Telephone: MAIDA VALE 1195-96.

Telegrams: Emwarneers, Kilb, London. One minute from Kilburn Park Station, Bakerloo Railway.

---

***High Prices Paid for***

GOOD QUALITY USED

**CONTINENTAL Machine Tools**

**Box C671, MACHINERY,**
Clifton House, Euston Road, N.W.1

---

**WE ARE KEEN BUYERS OF GOOD MODERN MACHINE TOOLS. INSPECTION WILL BE ARRANGED AT ONCE.**

**M. C. LAYTON LTD.**

Abbey Wharf,
MOUNT PLEASANT
ALPERTON, MIDDLESEX

Telephone: WEMbley 9641-8

---

*One* **WEBSTER & BENNETT** or **BULLARD** 24in. Vertical Borer

*Two* **HERBERT** No. 4 Senior Capstan Lathes

*Three* 4-spindle Drilling Machines with power feed to all spindles. Preferably Herbert.

**Box C887, MACHINERY, CLIFTON HOUSE, EUSTON ROAD, N.W.1**

---

**Power Presses, Power Guillotines.** Sheet Metal Machinery, urgently required.—STANCROFT LIMITED, Lancaster St., Birmingham, 4. Aston Cross 3741 or 2235.

---

***Wanted Urgently***

**Late Type Machine Tools**

Best Prices are offered for latest types of Machine Tools. Send us details of what you have and our representative will call to inspect.

**J. B. MACHINE TOOL CO. LTD.**
312 BRADFORD ST., BIRMINGHAM 5
Telephone: MIDland 4375

---

**CENTAUR TOOL WORKS,** Birmingham, 18, pay best prices for good modern secondhand Machine Tools by first-class makers. Write or 'phone and our representative will call.—'Phone: EDGBASTON 1118 and 1119. Grams: Capstan, Birmingham.

---

**Machine Tools, Power Presses** and Sheet Metal Machinery. Single machine or complete plant purchased. Immediate Inspection.—ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1.

---

**SURPLUS MACHINE TOOLS REQUIRED**

OFFER YOUR MACHINES TO

**J. E. RAISTRICK LTD.**

POYLE TRADING ESTATE
COLNBROOK, SLOUGH,
BUCKS.

TEL: COLNBROOK 2421

---

**DRUMMOND**

**'Maximatic' Multi Tool Lathes** suitable for crankshafts, not interested in Maxicut. Also required any other machine tools used in crankshaft production.

Full details to:

**BOX C 900, MACHINERY, Clifton House, Euston Road, N.W.1.**

---

**WANTED MODERN MACHINE TOOLS**

We pay cash for single machines or complete plants

*SEND US DETAILS*
*IMMEDIATE INSPECTION ARRANGED*

**SOUTHERN ENGINEERING AND MACHINERY CO.**
CONNAUGHT BUILDINGS,
TANNERS BROOK, MILLBROOK,
SOUTHAMPTON

Telephone: Southampton 73101/2/3

---

**Modern Good Class Machine** Tools and Sheet Metal Machinery required for prompt cash.—H. BELL (MACHINE TOOLS), LTD., Walter Street, Leeds, 4. Tel.: 63-7398.

---

**Wanted, Twin Saddle Lathe and** Honing Machines, any size, Monarch and Barnes Drills preferred.—MICROFINISH LTD., Exeter Parade, London, N.W.2. Telephone: Gladstone 1353.

---

**Rotary Swager, S/H, Required,** up to 1¼in. dia. tube.—'Phone details to MR. STAINES, Footscray 6868.

---

**1½in. B.S.A. Single Spindle Auto-** matic required urgently. Write or telephone full details, serial number, price, etc.—H & L AUSTIN ENGINEERING, LTD., Hilyn Works, Lockfield Avenue, Brimsdown, Enfield, Middx. Tel.: Howard 1151.

---

**MISCELLANEOUS WANTED**

---

**AC/DC Electric Motors, Generators,** transformers, disused stock of cable. Power houses bought and dismantled.—MRS. JOHN HYAMS & SON, 127, Lambs Lane Rainham, Essex. 'Phone: Rainham 5024.

---

# PLANT FOR SALE

**HENRY BUTCHER & CO.**
*Specialists in the*
• VALUATION AND SALE OF FACTORIES, PLANT AND MACHINERY •
73 CHANCERY LANE, LONDON, W.C.2
TEL.: HOLBORN 8411 (8 lines) GRAMS: PENETRANCY, HOLB., LONDON

**HERBERT** 3A Auto, chucker, speeds 25-500.
**HERBERT** 33 Hor. Mill, table 36in. × 9in., 500 r.p.m.
**HERBERT** 7 Comb. fully tooled, chucker.
**KEARNS** "OC" Hor. Borer, long bed and table.
**W. & B.** 36in. Vert. Borer. Re-conditioned.
**PARKINSON** 3J Hor. Miller, table 60in. × 15in.
**TOWN** 42in. and 5ft. and 6ft. Radial Drills.
**LUMSDEN** LEOD 18in. × 60in. Grinder.
**PEGARD** Vert. Mill. As new. Table 84in. × 20in.
**T. & C.** 200 ton Press, table 48in. × 36in. As new.
**STEINLE** Multi Spindle Drill and Tapper.
**WARD HAGGIS** 4/14in. stroke Slotter.
**JONES & SHIPMAN** ¼in. cap. Electrotap.
**INVICTA** 18in. Shaper, 4M. As new.
**DOWSON & MASON** Stress Relieving Furnace, cap. 10ft. 6in. sq. × 27ft. NEW. UNUSED.
**X-RAY** Unit (Phillips), 2½in. m.s. New.
**UNION-MELT** Power Pack, B.O. New.

PRECISION REBUILDERS WITH SIX MONTHS GUARANTEE.

**GIDLEY (MACHINERY) LTD.,**
LONGFORD BRIDGE, STRETFORD.
Tel.: LONgford 1363.
Member of B.A.M.T.M.

**EXCEPTIONAL OPPORTUNITY**

**SKODA Model** W.D.160 Ram Type Horizontal Boring Machine, available for delivery September/October, 1961, subject to prior sale. Please write or telephone for further details to :

**The Selson Machine Tool Co., Ltd.**
**23-25 Sunbeam Road, London, N.W.10**
**Telephone : ELGar 4000**

**Herbert 9B Combination Turret** Lathe with equipment—condition good. 400/3/50 electrics.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

**American First Class Machines** of all types can be supplied from our American Showrooms. Send your enquiries to K & C MACHINERY, LTD., Stephen Street, Coventry. Telephone: Coventry 23669.

**New Lathe Chucks at Bargain** prices. Pratt, Taylor, etc., 3-jaw and 4-jaw, 5in. to 26in.—List from EUCO TOOLS, 44, London Road, Kingston, Surrey. 'Phone: Kin. 9029.

**Electric Motors, New and** Secondhand, over 1,000 always available for sale, part exchange or hire. Prompt repairing service in event of breakdown.—JOHN RODWELL, LTD., Vicarage Road, Hornchurch, Hornchurch 48877 (3 lines).

*Choose from*
HUNDREDS of
**POWER PRESSES**
at the
**FJE MACHINE CENTRE**
Islington Park Street, London N.1.
(on the A1, near Highbury Corner)
Cash or monthly account, hire purchase, or by the FJE Machine Hire Plan
***F. J. EDWARDS LIMITED***
359-361 Euston Rd. London N.W.1

**TATE**

**PLANING MACHINES**
**DOUBLE COLUMN**
**STIRK** Model CX Planing Machine with capacity 16ft. by 5ft. by 5ft. Double Column with four Toolboxes. (Two Machines.)
**OPEN-SIDED**
**STIRK** open sided HILO Planing Machine with capacity 16ft. by 9ft. wide by 10ft. under crossrail. Table 16ft. by 7ft. Two toolboxes on crossrail and side toolbox. Additional toolbox on auxiliary upright. Motorised by STIRK split field drive of 400 volts 3 phase 50 cycles A.C. Supply.

**New Address**
TATE MACHINE TOOL CO. LTD.
348-354 KENSINGTON HIGH STREET
LONDON, W.14
WEStern 7031 (5 lines)

**EDWIN MILLEN & SONS LTD.**
70, CLERKENWELL ROAD,
LONDON, E.C.1.
Tel.: CLE. 6064 & 3602.

**DRILLING AND TAPPING**
**CORONA** 4ft. Radial Drill. £325.
**JONES & SHIPMAN** 2in. cap. Drill. £450.
**JONES & SHIPMAN** 1¼in. cap. Drill. £165.
Radial Drill, 4ft. 6in., box bed. £165.
**HERBERT** 1 sp. Drill on three-spindle base. £165.
**HAGO** H.G.25 High Efficiency, ¾in. cap. £250.

**GRINDERS**
**PALLAS** No. 2 Surface, 18in. × 6in.
**EXCEL** Surface, 10in. × 4in. £95.
**HERBERT HUNT** Twist Drill Grinder. £65.
**HERBERT HUNT** Tap and Reamer. £65.
**PFAUTER** Hob Grinder.
**REID** No. 2 18 × 6 Surface.
**BROWN & SHARPE** No. 2 18 × 6 Surface.
**SCRIVENER** No. 1 Centreless, with auto. feed.
**SMART & BROWN** Internal Grinder, 1¼in. Max.
**NORTON** 18in. × 7in. Hyd. Cyl. Grinder. £395.

**LATHES**
**OLDFIELD & SCHOFIELD** 15in. × 60in. £650.
**COLCHESTER TRIUMPH** 7in. × 48in.
**HERBERT SMALLPEICE,** 6in. × 24in. Multi-tool.
**MURAD** 4in. × 24in. AGH Lathe. £125.
**WARD** No. 7 Capstan B/F, B/C.
**C.V.A.** No. 8 Automatic.
**HARRISON** 4½in. × 42in. G.B. Full equip.
**HOGARTH** 6in. × 32in. S. & S. Lathe. £125.
**PITTLER** Turret Lathe, 2¼in. cap. £95.
**RIVET** Instrument Lathe, 4½in. × 24in.
**SPRINGFIELD** 14in. Swing F. & B. Lathe. £225

**MILLERS (Vert. and Horiz.)**
**CENTEC** No. 3R Auto-cycle, pro mill.
**CINCINNATI** 2MH., 53in. × 11in.
**HEY** Duplex Spline Mill. £175.
**ADCOCK & SHIPLEY** 1VM Vert. 25in. × 7in. As new.
**HARDINGE** 24in. × 6in. Prec. Auto feed. £165.

**POWER PRESSES AND SHEET METAL MACHINES**
6ft. × 16 s.w.g. **CHICAGO** Folder. £150.
6ft. × 6 s.w.g. **EDWARDS,** high lift. £150.
6ft. × 4in. Slip Rolls. £70.
**BESCO** 10 ton Power Press. £175.
**HUMPHREYS** 10 ton Power Press. £175.
**E.M.G.** 9-ton Airdraulic. £200.
**KENNEDY** 2in. Tube Bender. £85.
**FLY** and Kick Presses.

**MISCELLANEOUS**
**HOLROYD** Profiling Machine. £175.
**PFAUTER** R.S.2 40in. dia. Hobber
**THIEL** Filing and Sawing Machine. £95.
**HURTH** Key Seating Machine. £225.
**THIEL** Punch Shaper.
**ORMEROD** 12in. Shaper with Cam Cutting Attach.
**TMA** Engraver with type.
**AEROGRAPH** Twin Cylinder comp. 100 p.s.i.
**MATHEY** Jig Borer with clocks. As new.
**RAPIDOR** 15in. × 15in. Filing and Sawing. £165.
**PFAUTER** 000 Gear Hobber, with gears. £150.
**PHILLIPS** 40 kVA Spot Welder. £165.
Other machines in stock.

**WE BUY** | **WE SELL**
**EXCHANGES WELCOME** | **HIRE PURCHASE ARRANGED**

Classified Advertisements (PLANT FOR SALE, contd.)

# RING BELLS for machine tools

LEEDS 63-7398

NEWALL USED MACHINE DIVISION

**HAVE AVAILABLE FOR EARLY DELIVERY**

**One NEWALL 2436 Jig Borer, fully rebuilt and carrying maker's guarantees.**

**One NEWALL No. 0 Jig Borer, fully rebuilt and carrying maker's guarantees.**

**Capacity: 18in. by 12in. Table 14in. Spindle Nose to top of table**

**One NEWALL 'L1' Internal Grinding Machine, 10in. by 24in. fully rebuilt and carrying maker's guarantees. Maximum Grinding Depth: 12in.**

**One NEWALL No. 1 Jig Borer, fully rebuilt and carrying maker's guarantees.**

**One NEWALL No. 2 Jig Borer, fully rebuilt and carrying maker's guarantees.**

THE

NEWALL

USED MACHINE DIVISION
OUNDLE ROAD
ORTON LONGUEVILLE
PETERBOROUGH

Telephone: Peterborough 67116/7

---

**Niles 36in. Vertical Boring Machine**—12 speeds 3.6 to 57 r.p.m. 400/3/50 electrics.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

---

**Archdale 18in. Horiz. Production Miller.** Kneeless type. A.G.H. Table 32in. × 11¼in. Auto Cycle. Motorised.—WILCOX & CO., Barr Street, Birmingham, 19. NORthern 1234/5.

---

**Cincinnati 28-60 Hydrotel Vertical Miller,** fitted with depth control, 400/3/50. Good condition.—BOX C879, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Siemens Schuckert Electrically**

Heated Furnace, 6ft. 10in. dia., 8ft.¶10in. deep, 550 deg. C., 100 kW, 400 volts.
New Process 100 kVA Seam Welder, 400/3/50.
British Federal 50 kVA Flash Butt Welding Machine, 400/3/50.
Fielding Hydraulic Pipe Bender, up to 8in.
200 Ton Fielding Downstroke Hydraulic Press, 14in. ram, 42in. stroke, 63in. daylight.
100 Ton Fielding ditto, 10in. ram, 72in. stroke, 99in. daylight.
50 Ton Fielding ditto, 3ft. stroke.
Bliss 70 Ton Geared Double Sided Power Press. 400/3/50 supply.
3 Bliss No. 304 Vertical Single Action Drawing Presses, 7½in. stroke, 50 tons. American.
Bennie Punching, Shearing and Section Cropping Machine, 4½in. × 4½in. × ½in. angle.
Windsor 6-oz. Plastic Injection Moulding Machine.
Rushworth Guillotine, 6ft. × ¼in.
Sedgewick Bending and Folding Machine, 6ft. × ¼in., motorised.
"Pyramid" Bending Rolls, 9ft. 0in. × ½in.
200 Tons Tangye Hydraulic Straightening Press, bed 25ft. × 3ft., stroke 21in., motorised travelling table, 2 ram pump.
Hugh Smith Double Table Scarfing Machine, 13in. fixed stroke, from 16in. to 8ft. wide, 1½in. thick steel plates.
Crow, Harvey Punch, Shears and Angle Cropper, 18in. blade, 27in throat, heavy duty.
Pels Punch Shears and Cropper, 12in. blade, shear ½in., takes 6in. × 6in. × ½in. angles.
Robertson Shears, ½in. capacity, 10 h.p., 28in. blade, 9in. maximum opening. (Two.)
Berry Plate Guillotine, capacity 4ft. × ½in., 18in. throat, 30 h.p. motor.
New 1-cwt. and 2-cwt. Hammers by Massey and Alldays & Onions, also 3-5-cwt. secondhand E.O.T. Cranes.
30 Ton Marshall Fleming, 29ft. span, cab control.
25 Ton Clyde, 21ft. 9in. span, cab control 1954. Can convert any span to 95ft.
20 Ton Vaughan 42ft. 3in. span. Unused.
20 Ton Morris Goliath, 35ft. span, 5 ton auxiliary.
10 Ton Heywood, 34ft. span. Unused.
10 Ton Morris, 32ft. 10in. span, cab control.
10 Ton, 60ft. span. 1955. (Two.)
7 Ton, 37ft. span. 1950. (Two.)
5 Ton, 37ft. span. 1944.
3 Ton Morris, 146ft. span. 1954.
FRED WATKINS (ENGINEERING), LTD., Coleford, Glos. 'Phone: Coleford 2271 (5 lines)

---

**NEW MACHINES FOR IMMEDIATE DELIVERY**

**DEFUM** Models HWC.110 Horizontal Boring Machines, spindle diameter 4¼in. table 4ft. by 4ft. 6in.

**SCHNEIDER** Model JOH/2 Hydraulic Universal Surface Grinder. Capacity 66in. by 24in. by 22in.

**METALEXPORT** Model CRA. 710 Hydraulic Cold-Saw. Capacity 10in. diameter or 8in. square section. Saw blade diameter 28in.

*Please send for full details:*

**ELGAR MACHINE TOOL CO. LIMITED**

172-178 VICTORIA ROAD, ACTON, LONDON, W.3.

Telephone: ACOrn 5555 (7 lines)

---

**GRIDLEY** Type L 5in. Auto.
**LE BLOND** No. 2 Deep Hole Drill.
**LA POINTE** HP30 Broach, 1952.
**ELECTRAULIC** VBH, 15 ton Broach.
**HARRISON** 12in., 13in., 17in. Lathes. NEW.
**CINCINNATI** 1-18 Mill auto stop BLE.
**BLANCHARD** 18 Surf. Grinder.
**VICTORIA** U3 Monotrol Univ. Miller, 1953.
**CONOMATIC** 8 sp. 1¼in. Bar Auto.
**BROWN & WARD** ¾in. and 1¼in. Autos.
**WARD** 3A Capstans.
**HERBERT** 4 Senior Capstan.
**CLEVELAND** 1 3/16in., 1¼in., 2in. and 2¼in. Autos.
**MASSEY** 5 cwt. Press Hammer, 1942.
Four **UNION** ¾in. Pedestal Drills. NEW.
**VICTORIA** V2 Swiv. Head Mill, 1954.
**BULLARD** 16in. 6-sp. Mult-Au-Matic, 1943.
**GLEASON** 12in. Bevel Gear Gen., 1945.
**FELLOWS** 61A, 645A Gear Shapers.
**BRYANT** 16-38 Internal Grinder.
**HEENAN-FROUDE** Baling Press, 1947.
**SCHULER** Vertical Dieing Press.
**REDMAN** 12 × 4 × 4 Planer.
**HERBERT** 2S Turret Lathe.
**MILWAUKEE** 2H, 2K, 3H, 3K Millers.
**BLISS** 304A 50 ton Press, 4in. stroke.
**NORTON** 14 × 72 Univ. Grinder.
**BROWN & SHARPE** No. 3 Univ. Grinder.
**DEFIANCE** 25A Horizontal Borer.
**ARCHDALE** 38in. Sens. Radial Drill.
**NEWALL** type L 10in. × 48in. Grinder, 1942.
**BUTLER** 8in. Toolroom Slotter.
**HEALD** 72A Internal Grinders (3).
**NORTON** 12 × 36 Universal Grinder.
**WARNER & SWASEY** 3, 5 and 2A Turrets.
**BROWN & SHARPE** No. 3 Vert. Mill, 1942.
**PRATT-WHITNEY** 12B 2-sp. Profiler, 1941.
**EDGWICK** No. 2 Universal Miller.
**BARNES** No. 2 Horizontal Hones (3).
**CHURCHILL** No. 1 Planetary Grinder.
**ORCUTT** HM24 Gear Grinder, 1944.
**BUTTERWORTH** 1¼in. S.S. Auto.
**GISHOLT** 5 and 1L Turret Lathes, 1941-43.
**GRIDLEY** Model R, 2¼in. cap., 4-sp. Auto.
**ARCHDALE** 18in. and 30in. Vert. Mill, 1942.
**CINCINNATI** 2MH Plain Mills.
**MONARCH** Copying Lathe, 1946.
**CHURCHILL** PBH 12 × 36 Univ. Grinders.

All modern fully motorised machines.

**HUNDREDS MORE.**

**J. B. MACHINE TOOL CO., LTD.,**
312/4, BRADFORD STREET,
BIRMINGHAM, 5.
Tel.: MIDLAND 4375.
AND AT WOLVERHAMPTON

---

**LEONARD ROTH**
ABBOT ST., KINGSLAND HIGH ST.,
DALSTON JUNCTION,
LONDON, E.8
TERMS ARRANGED
Tel.: CLIssold 0513/4

**COLCHESTER STUDENT** Lathe, 3 and 4-jaw Chucks., 400/3/50, 4-way toolpost, faceplate, suds pump, etc., in excellent condition. £425.
**DEAN, SMITH & GRACE** Lathe, 6½in. × 36in., 3 and 4-jaw chucks, 400/3/50. £275.
**HARRISON** Lathe, 5½in. × 36in., 7½in. 3-jaw chuck, ½-h.p motor. £95.
**PRIMON** 6 Ton Power Press, adjustable stroke, motorised 400/3/50 for bench mounting. £75.
**EDWARDS** 4 Ton Power Press, adjustable stroke, motorised 400/3/50 for bench mounting. £48.

PLEASE WRITE FOR LISTS

# Modern Machine Tools Ltd

**QUALITY USED MACHINE TOOLS IN STOCK**

**GRINDERS**
BROWN & SHARPE No. 2 Surface Grinder. 18in. by 6in. capacity. Auto table traverse.
HOBROUGH No. 2 A Surface Grinder, 18in. by 6in. capacity. Hand Table traverse.
LUMSDEN 70 RXXO Vertical Cup Wheel Grinder. Wheel 7in. by 3in. by 4in. Table 20in. by 6in. Table travel 28in.

**LATHES**
SMART & BROWN Model 'A' 4¼in. S.S. & S.C. Lathe. 9¼in. swing. Speeds (12) 39-1,430 r.p.m. 20in. between centres. (*REBUILT.*)
DEAN, SMITH & GRACE, Model 13Z 6¼in. S.S. & S.C. Lathe. Speeds 28-889 r.p.m. Spindle bore 1¼in. 30in. between centres. 8in. 3-jaw Chuck, Toolpost, Guards, Steady, and Suds Equipment.
V.D.F. 9in. S.S. & S.C. Lathe. Swing in gap 30in. Speeds 12-500 r.p.m. Spindle bore 2in. 50in. between centres. 16in. 4-jaw Chuck. Toolpost. Steady and Suds Equipment.

**MILLERS**
ARCHDALE 28in. Horizontal Miller. Power Feeds. Table 49in. by 13in. Speeds (6) 30-462 r.p.m. Lighting Equipment.

**NEW MACHINES IN STOCK OR FOR EARLY DELIVERY**

**MYFORD** MG.12 Grinders.
**PROGRESS** ¼in., ⅜in., 1½in. and 1¾in. Drilling Machines.
**RAPIDOR** 6in. Hacksaws.
**VICTORIA** U.2 and U.2 Rapidmil and V.2 Millers.
**MITCHELL** 8¼in. and 12¼in. Lathes.
**ELLIOTT** 7¼in. Centre Lathes.
**ARNO** Millers.
**BEAVER** Millers.
**COLCHESTER** Chipmaster, Student and Triumph Lathes.
**SMART & BROWN** "A", and "1024" Lathes and H.3 and H.5 Toggle Presses.
**TOWN** A.E.4 and A.E.5 3ft. 6in. and 4ft. 6in. Radial Drills.

*COMPREHENSIVE STOCK LIST AVAILABLE ON REQUEST.*

P.O. BOX No. 56 GOSFORD STREET COVENTRY Telephone: COVENTRY 22132-6 Cables: MODERN COVENTRY

# WIDDOWSONS

**ASQUITH OD. 1. RADIAL DRILLING MACHINE**
Two Available
4ft. 6in. model speeds 31 - 830 r.p.m.
4ft. 0in. model speeds 42 - 1130 r.p.m.
Both No. 5 M.T.

**GLEASON 12in.**
Serial No. 20949 Straight Bevel Gear Generator. Double Roll.
Combination roughing and Finishing
**FULL EQUIPMENT**

**PFAUTER 24in. MOTOR DRIVEN UNIVERSAL GEAR HOBBING MACHINE**
Plain & Tangential Feed Hob Slide
**PFAUTER MOTOR DRIVEN HOB GRINDING MACHINE**

**PEARN-RICHARDS PRT2N HORIZONTAL BORING & FACING MACHINE**
3in. Traversing Spindle.
Chain drive to head

## HERBERT WIDDOWSON & SONS LIMITED
***Canal Street Works, Nottingham · Telephone: 51891 (4 lines)***
**MEMBER OF B.A.M.T.M.**

# M. WARD
## (Machine Tools) Ltd.

**1, KILBURN HIGH ROAD, LONDON, N.W.6**

Tel.: Maida Vales 1195/6
'Grams': Emwarneers, Kilb., London.

**LATHES**

**COLCHESTER** "Triumph," 7in. × 48in. Gap S.S. & S.C.
**LE BLOND** 15RP S. & S. 15in. × 24in.
**CARDIFF** S.S. & S.C. 8½in. × 48in. "Senior." 1952 M/c.
**CRAVEN** 36in. Swing × 12ft. Between S.S. & S.C.
**SMART & BROWN** 4in. × 18in. S.S. & S.C.
**SWIFT** 12in. × 12ft. S.S. & S.C. Heavy Duty R/trav. to saddle.
**LANG** 36in. Surfacing and Boring.
**ACME** No. 5W Capstan, chuck machine.
**RYDERMATIC** No. 12 Multi-Tool.
**D.S.G.** 13Z Minor S.S. & S.C.
**WILLSON** 6½in. × 36in. Gap Bed S.S. & S.C.

**CAPSTANS AND AUTOS**

**WARD** No. 7 (Curran Sub-Contract).
**TAYLOR** No. 1263 Capstan, ¼in. cap.

**DRILLS**

**CORONA** 3M Pillar, 1¼in. cap.
**KITCHEN & WADE** 2ft. 6in. Radial, 2in. capacity.
**CORONA** Model 9FX Super High Speed Bench.
**CORONA** Model 12AX Bench, ⅝in. cap.
**BRISDON** Model 52 Pillar, ½in. cap.

**GRINDERS**

**KEIGHLEY** KN Internal.
**GRAND RAPIDS** No. 35 Hyd. Hor. Spin. Surface.
**HERBERT** JUNIOR Surface, 10in. × 6in. × 9in.
**BROWN & SHARPE** No. 5 Surface.
**BROWN & SHARPE** No. 23 Plain, cap. 10in. × 48in.
**BROWN & SHARPE** No. 2 Surface, cap. 6in. × 18in.
**SMART & BROWN** Internal, 1½in. cap.
**BROWN & SHARPE** No. 5, 3in. × 18in. Plain.
**BALLINGER** 10/24 "Versatile" Abrasive Cutting-off Machine.
**NEWALL** Model L.U. 10in. × 36in. Hyd. Universal.
**B.S.A. LANDIS** Type C 6in. × 18in. Hyd. Plain.
**SNOW** Mod. O.S.72 Surface, cap. 15in. × 72in.
**CHURCHILL** Mod. H.C.B. Internal Auto Size.
**HAHN & KOLB** Hyd. Disc Lapping M/c.
**JACKMAN** No. 22 Disc. 18in. dia.
**LUMSDEN** Mod. 12M Tool, 14in. × 2 wheel.

**MILLERS—Vertical**

**REED PRENTICE** Mod. 3VG, table 38in. × 10½in.
**CINCINNATI** Model O8 Production.
**KENDALL & GENT** Duplex Profile, table 18in. × 15in.

**MILLERS—Horizontal.**

**BROWN & SHARPE** No. 000 Plain Auto Miller.
**BROWN & SHARPE** No. 2 Universal light type.
**ADCOCK & SHIPLEY** No. 1 AB Plain, table 26in. × 7in.
**RICHMOND** 2HS Plain, table 35in. × 9in.
**ARCHDALE** 20in., table 40in. × 10in.
**ASQUITH** H.K.1 Duplex Keyway, table 43in. × 10in.
**CINCINNATI** Mod. O.K. Prod., table 34in. × 12in.
**ARCHDALE** 14in. Plain, table 27in. × 8in.
**ARCHDALE** 28in. Plain, table 49in. × 13in.

**BORING MACHINE**

**KEARNS** Mod. O.C. Horizontal, 3in. dia. spindle.

**SAWING MACHINES**

**EHJ** No. 13 Filing and Sawing.

**SHAPERS**

**TOWN** 14in.
**HERBERT** N.D. 20in.
**ORMEROD** 14in.

**GEAR CUTTER**

**MAXICUT** Gear Shaper, Mod. No. 2.

**MISCELLANEOUS**

**T.T. & H.** Javelin Etchers, Multi-heads (3 m/cs.).
**HEAP** 2in. Screwing Machine.

# TATE

## ROLL GRINDING MACHINES

**CRAVEN** Heavy Duty Roll Grinding Machine with capacity for rolls 42in. diameter by 12ft. between centres and fitted with automatic cambering. Will take rolls up to 25 tons weight. Fully motorised machine of modern design. Weight 25 tons.

**WALDRICH-SEIGEN** Model WS 28 Roll Grinding Machine. 36in. Swing by 13ft. between centres with automatic cambering mechanism, etc.

**New Address**

**TATE MACHINE TOOL CO. LTD.**
**348-354 KENSINGTON HIGH STREET**
**LONDON, W.14**
**WEstern 7031 (5 lines)**

---

**Three New Britain Model 467** 4-spindle 6in. Chucking Automatics. Cheap for quick clearance.—BOX C880, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**AUTOS**

**CONOMATIC** 1¼in. 8 spindle. Type W.W.
**WICKMAN** 1¼in. 5 spindle. 1941 machine.
**WICKMAN** 1¼in. 5 spindle. 1941 machine.
**WICKMAN** 6in. 5 spindle Chucker.

**DRILLING**

**ASQUITH** 4ft. 6in. O.D.1 Radial Drill.
**ASQUITH** 4ft. O.D.1 Radial Drill.
**PROGRESS** 5E. Round table.

**GEAR SHAPING**

Model 61 **FELLOWS** Gear Shaper. Straight spur, 35in. dia. × 5in. face width.

**LATHES**

**WARNER & SWASEY** No. 2A Long Bed.
**SOUTHBEND** 16in.
**EDGWICK** 7in.
**DEAN, SMITH & GRACE.** Height of centres 7in.
**MONARCH** 22M S.S. Taper Turning Lathe.
**WARD** 10 Combination Turret Lathe.

**MILLING**

20in. **ARCHDALE** Plain Mill. Rapid.
28in. **ARCHDALE** Rapid All Ways.
18in. **EDGWICK** Production Mill.
**CINCINNATI** No. 5 High Power Plain Hor. 1942 machine.
**KENDALL & GENT** C.V.M.40.
**KENDALL & GENT** C.V.M.25 Vertical Mill.

**SHAPING**
**GUILLOTINES**

**EDWARDS** 6ft. × ⅛in. Overcrank.
**EDWARDS** 8ft. × ¼in. Overcrank.

**FOLDERS**

**MORGAN** 6ft. × 14g. Universal.
**EDWARDS** 6ft. × ¼in. Swing beam, hand geared.
**EDWARDS** 6ft. × 14g. Open ended.
**EDWARDS** 6ft. × 16g. Open ended.

**ELDAIR** NEW PRESS BRAKES.
6ft. × 12g. between columns. Delivery 10 weeks.
6ft. × ⅛in. between columns. Delivery 3 weeks.
10ft. × ⅛in. between columns. Delivery 1 week.

All machines motorised 400-440/3/50.

# STANCROFT LTD.
**BEDWORTH ROAD, COVENTRY**
Telephone: Coventry 88072/3.

---

# TRY LIBERTY 6644 FOR YOUR MACHINES

Our stock includes Myford MG12 Grinders, Eagle Surface Grinders, Myford Lathes, Boxford AUD 4¼in. Lathes, Willson 6¼in. Lathes, Pacera Drilling Machines from ¼in. to 1¼in. capacity, Startrite Bandsaws, Kennedy, Rapidor and Q. & S. Hacksaw Machines, Centec Milling Machines, 18in. Alba Shapers, Vices and Rotary Tables of all types.

**LIBERTY ENGINEERING SUPPLIES LTD.**
**Colliers Wood High Street, S.W.19**

---

**Chas. Taylor Vertical Cock Boring** Machine. Model 1414. Cap. 2in. dia × 3½in. long taper. Motorised.—WILCOX & CO., Barr Street, Birmingham, 19. NORthern 1234/5.

---

**Raboma Radial Drill, 4ft., No. 5** Morse taper, can be seen working. Berco Honing Machine with coolant pump.—ALFRED ALDERSON & CO., 57, Bradford Road, Stanningley, Leeds. Pudsey 4222.

---

**Wickman Moulton Thread Milling** Machine. Model 1.B. Capacity 7½in. internal, 6in. external. Motorised.—WILCOX & CO, Barr Street, Birmingham, 19. NORthern 1234/5.

---

**Newall-Keighley Plain Grinder,** Type L 12 24in. × 12in. Very good condition. 6 months use only.—BOX C906, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Pfauter Model R1 Gear Hobber,** 16in. capacity—£425.
Wallwork 24in. Gear Hobber in excellent condition—£325.
Pfauter Type Gear Hobber, 15in. capacity—£175.

All motorised 400/3/50.

K & C MACHINERY, LTD.,
Stephen Street, Coventry.
Telephone 23669.

---

**Precimax Hydraulic Plain Cylindrical** Grinder. Type M.P.L. Capacity 6in. × 24in. Plunge Feed. Motorised.—WILCOX & CO., Barr Street, Birmingham, 19. NORthern 1234/5.

---

**B.S.A. ¾in. Single Spindle Autos.,** motorised, gears, barfeed, etc. Fair cond., also Brown & Sharpe 00 with motorising unit.—C. L. THOMAS, LTD., Stirling Road, Solihull. Tel. 3075-6.

---

**1" PAINT, VARNISH or SUDS BRUSHES**
**Good quality, NEW**

**20/- PER DOZEN Post Paid**
**WM. HURLOCK JNR. LTD. (Estab. 1904)**
**5-7 Kingston Hill, Kingston-on-Thames Surrey. KIN 4826-7-8**

Classified Advertisements (*PLANT FOR SALE, contd.*)

# K·E·N·T

**AUTOMATICS**

**C.V.A.** No. 26. 1960 Machine.
**C.V.A.** No. 12. 1960 Machine.
**C.V.A.** No. 8. 1950.
**B.S.A.** ¼in.

**LATHES**

**Broadbent** 14in. × 7ft., unused.
**Sicmatic** 14in. × 27in. Hyd. Lathe. 1960.
**D.S. & G.** 18in. × 12ft. S. & S.
**Betts Bridgeford** 15in. × 18ft.
**Lang** 6¼in. × 3ft. S.S. & S.C.
**Holbrook** 6¼in. × 4ft. Gap bed.

**MILLING MACHINES**

**Sant Andrea** U.F.O.3 Hor.
57in. × 14in., as new.
**Archdale** 20in. Hor. Rapid.
**Reinecker** Vert. 52in. × 24in. with built in cir. table, 30in.
**Jason** Vert. 48in. × 12in. Sw. and Sl.
**Herbert** 15s Vert. 48in. × 12in.
**Adams** No. 5 Thread Mill.

**CAPSTANS AND TURRETS**

**Minganti** 1a Turret, 2½in. Bar.
**Gisholt** No. 3 Capstan.
**Warner & Swasey** No. 3 Capstan.
**Ward** No. 2a Capstan Lathe.
**Herbert** 1S Capstan Lathe.
**Murad** 3Q Capstan Lathe.

**MISCELLANEOUS**

**Churchill** NB 18in. × 6in. Surface Grinder
**B. & S.** No. 2 Surface Grinder.
**Excel** No. 1 Surface Grinder.
**C.V.A.** 10 Die Press.
**Maiden** Bar-ending Machine.
**Raboma** 4ft. 6in. Radial Drill.
**K. & W.** 2in. Pillar Drill.
**Granor** 26in. H.D. Shaper.
**Mutto** Vert. Honer.
3 Ton Hi-ton Press.
**S. Platt** 3in. × 14g. Tube Roller.
**Edwards** 4ft. × ¼in. Power Guillotine.

Many other machines in stock.

All motorised 440/3/50.

**K·E·N·T MACHINERY & ENGINEERING CO.**

**Datchelor Place, Mews, London, S.E.5**

Telephone: ROD. 4149

---

**Taylor & Challen 40 Ton Un**-geared press, double roll feed and scrap cutter, 4½in. wide rollers, 1½in. stroke, motor, inclined, ex. Cond.—C. L. THOMAS, LTD., Stirling Road, Solihull. Tel. 3075-6.

---

**Crypto-Atlas Horizontal Band**-saw Machine. Capacity 5in. dia. 16in. dia. wheels. Motorised.—WILCOX & CO., Barr Street, Birmingham. NORthern 1234/5.

---

# FORREST

**BENNIE** 4ft. × ¼in. Bending Rolls.
**SWIFT** Lathe, 15in. × 22ft. 6in.
**BROADBENT** Lathe, 12½in. × 6ft. 6in.
**WILSON** Lathe, 8in. × 3ft. 0in.
**RHODES** 6ft. × ¼in. Guillotine.
FACEPLATE LATHE, 80in. swing.
**RICHARDS** No. 1 and 4 Horiz. Borers.
**RICHARDS** 5ft. Double Column Vertical Borer.

**W. FORREST & CO. LTD.,**
**SYLVESTER GARDENS,**
**SHEFFIELD, 1.**
'Phone: 23314/5

---

# TIMES MACHINERY

**SOME NEW MACHINES AVAILABLE FOR IMMEDIATE DELIVERY FROM OUR STOCKS**

**LATHES**

SUPER ALPHA 6in. × 40in. between centres.
MIN. 8in. × 40in. between centres.
CLOVER 6in. × 31in. between centres, with or without Hydraulic copying equipment.
RI Type M210, 8½in. × 59in. between centres.
RI Type M250, 10in. × 59in. between centres.

**MILLERS**

CONTI CS.1200 Universal. Table size 47in. × 10in.
CONTI CS.1200R, as above but with rapid traverses.
CONTI CS.1300 Universal. Table size 60in. × 12in.
CONTI CSE.1500 Universal. Table size 67in. × 12½in.
RUHLA Universal Tool Miller. Table size 32in. × 12½in.
AUERBACH Hand Lever Mill. 16in. × 5in. table size.
BEAVER Type "A" Turret Miller.
SCHUBERT Hand Lever Horizontal Bench Machine. Table size 14in. × 5½in.
SENIOR MI Horizontal. Table size 25in. × 6½in.

**SHAPERS**

FIL 25in. stroke, with swivel table and automatic down feed.
FIL 29in. stroke, as above but with rapid table traverses.

**BORERS**

UNION BFT.63. 2½in. spindle machine complete with facing head.

**COLDSAWS**

SAALFELD SGK.800. 11in. dia. capacity.

**DIE FILING AND SAWING MACHINES**

LIMATIC BI2. Table 11½in. × 11½in., stroke 1¾in.-5in., throat 6½in.

**DRILLS**

I.M. ¼in. capacity. High speed bench Drills.
I.M. ½in. capacity. High speed bench Drills.
I.M. ¾in. capacity. High speed bench Drills.
I.M. ⅞in. capacity. High speed bench Drills.
I.M. 1¼in. capacity. High speed pedestal Drill.
I.M. 3 spindle, ⅞in. capacity. High speed Multi-Head Floor Mounted Drill.
SOLBERGA 1in. capacity Bench Drilling Machine.
PACERA ½in. capacity Bench Drill.
PACERA ¾in. capacity Bench Drill.
ELHA 1¼in. capacity Column Drill.
ELHA 2⅞in. capacity Column Drill.
TOS V40 1¾in. capacity Column Drill. Sliding head.

**GRINDERS**

M.F. Bench Surface Grinder. Table size 11¾in. × 6in.

ALL MACHINES DEMONSTRATED UNDER POWER BY ARRANGEMENT.

**THE TIMES MACHINERY CO., LTD.,**
**POYLE ROAD, COLNBROOK, SLOUGH, BUCKS.**
Tel.: Colnbrook 2442/3/4.
Telegrams: Timachine, Colnbrook, Slough.

---

# ELLIOTT INVITES YOU

*to see the range of*

**FINE MACHINE TOOLS** *at*

**B. ELLIOTT** (MACHINERY) **LTD**

**VICTORIA WORKS, LONDON, N.W.10**
*Tel. ELGAR 4030*

---

**American Toolworks Centre** Lathe, 19in. Swing, 30in. between Centres. Spindle speeds 17-600 r.p.m. Excellent condition.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

---

**10in. × 24in. Churchill Model** PAH Hydraulic Universal Tool and Cutter Grinding Machine with rise and fall wheelhead. Fully m/d 400/3/50. Variable hydraulic motion 6in.-180in. per minute.—LEE & HUNT, LTD., Crocus Street, Nottingham Tel.: 84246.

---

# TATE

**USED HOLROYD DOUBLE COLUMN PLANO MILLING MACHINE** of modern design generally as follows:—

| | |
|---|---|
| Table | 16ft. × 8ft. 2in. |
| Table traverse | 17ft. 3in. |
| Width between columns | 9ft. 6in. |
| Maximum distance between heads | 7ft. 10in. |
| Minimum distance between heads | 1ft. 8in. |
| Spindle speeds | 7.3-186 r.p.m. |
| Spindle traverse | 25in. |
| Spindle bored | No. 6 M.T. |
| Weight | 50 tons |

The machine is complete with two heads on cross-rail with 25 h.p. motor drive. Table drive by 10 h.p. motor drive providing feeds 0.88-237 inches per minute. Saddle feeds for cross milling 0.89-24 inches per minute. Quick return to table 40in.-120in. per minute.

Machine operated by electric PENDANT CONTROL.

**New Address**
**TATE MACHINE TOOL CO. LTD.**
**348-354 KENSINGTON HIGH STREET**
**LONDON, W.14**
**WEStern 7031 (5 lines)**

**HELIOT**

35 GREENWICH CHURCH ST.
LONDON. S.E.10 GRE.1222

**REBUILD WARD CAPSTANS**

**EXCHANGE MACHINES AVAILABLE**

**ALBERT EDWARDS**
**(MACHINERY) LTD.,**
79/89, PENTONVILLE ROAD,
LONDON, N.1.

Telephone: TERminus 0167/8/9.

**CRAVEN** 82 Rigid Plain Horizontal Milling Machine. Table 47in. × 15in.
**SONDERMAN & STEIR** 40in. Vertical Boring Machine. Table speeds to 135 r.p.m.
**E.M.B.** 15 ton Flexi-Press. 12in. stroke.
12½in. Super **PROGRESS** Gap Bed Lathe. Admits 7ft. 9in. B.C. Speeds 30/1031 r.p.m.
**ARCHDALE** 28in. Milling Machine. General purpose.

All above machines are Motor drive, standard voltage.

**A Good Number of High-class** Machine Tools always in stock. At ELLISON (SALFORD), LTD., Cook Street, off Chapel Street, Salford, 3, Lancs.

**Le Blonde Regal Lathes, 19in. ×** 48in. A.G.H. Norton Box, equipment, extra change gears, ex. Condition, also 15in. × 36in. similar, fair condition.—C. L. THOMAS LTD., Stirling Road, Solihull. Tel. 3075-6.

**HIGH QUALITY USED MACHINE TOOLS**

**ARCHDALE** 20in. Milling Machine, table size 40in. × 10in., power and rapid traverses to table, reversing spindle, backlash eliminator. 400/3/50.
**COVMAC** 13in. Swing Gap Bed Lathe, by 6ft. 3in. b.c. 400/3/50.
**DENHAM** 6in. Gap Bed Lathe by 2ft. 3in. b.c. 400/3/50.
**BARDONS & OLIVER** No. 3 Universal Turret Lathe. 400/3/50.
**WARNER & SWASEY** 1A Turret Lathe. 400/3/50.
**KELLY** 28in. Stroke Heavy Duty Shaping Machine with swivelling table. 400/3/50.
**RUSSELL** Saw Sharpening Machine, max. capacity 42in. diameter. 400/3/50.
**ORMEROD** 12in. Slotting Machine. 400/3/50

WE UNDERTAKE REBUILDING OF ALL TYPES OF MACHINE TOOLS

**CENTAUR TOOL WORKS,**
**EYRE STREET, SPRING HILL,**
**BIRMINGHAM, 18**

Tel. EDGbaston 1118 & 1119. 'Grams: Capstan, Birmingham.

**Brown & Sharpe OOG ½in. Cap.** Auto Screw Machine, Serial No. 14537. Complete Bar Feed and Turret Equipment, etc

Further details from:—
C. & C. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

**ACBARS LIMITED,**
**57a, HOLBORN VIADUCT,**
**LONDON, E.C.1.**

Telephone: Central 2287 Telegrams: Acfirb Cent. London

**AVAILABLE FROM STOCK**

**All machines listed below are at our Works in Sutherland Walk, Walworth Road, S.E.17**

**-ROACH**
FORST RIA5 Universal Vertical Broach for internal and surface broaching, 5 tons, 39½in. stroke. 1952 machine.

**RADIAL DRILLS**
New VOEST Swivel Head Radial, 1in capacity, 3ft 3in. radius.

**GRINDERS**
BROWN & SHARPE No. 2 Surface.
GRAND RAPIDS 24in. × 10in. Hydraulic Surface Grinder.
MOPCO 39in. × 11in. Hydraulic Surface Grinder, with inclinable spindle for horizontal or vertical grinding.
CHURCHILL 10in. × 24in. Universal.
LANDIS 12 × 48 Universal.
BROWN & SHARPE No. 3 Universal.
NORTON 14in. × 36in. Universal.
New BAMKIN Tool and Cutter.

**CAPSTAN AND TURRET LATHES**
GISHOLT IL Turret Lathe.
FOSTER No. 28 Turret Lathe.

**CENTRE LATHES**
HOLBROOK 6½in. Taper Turning.
WARD, HAGGAS & SMITH 8½in. Gap Bed, 36in. between centres.
CROMWELL 3½in. Precision

**MILLERS**
ARCHDALE 14in. Manufacturing type.
ARCHDALE 20in. Twin Overarm Horizontal. Table 40in. × 10in.
KENT-OWENS 1-8 Hydraulic Production.
SUNDSTRAND No. 0 Rigidmill.
CUTTAT 15-412 HYPERMILL Kneeless Production. Traverse 47½in. Table size 66½in. × 15½in. 15 h.p. Motor. 1952 Machine.
MILNES Sw. Hd. Vertical. Table 30in. × 8½in.
HERBERT 23V Vert. Table 68in. × 17in., 48in. traverse.
HOLROYD T117 Thread Miller.
HELLER Automatic Thread Millers (4).
ASQUITH HKO Duplex Keyseater.

**PRESS**
V & O No. 11 Double Action. Approx. 10 tons. Roll feed. Max. draw 1in.

**All machines motorised 400/3/50 unless otherwise stated.**

**THE SPOT ● TO WATCH!**

**FOR GOOD CLASS SECONDHAND MACHINES AT LOW COST**

**BROWN & SHARPE** 2G Auto. Ser. No. 8314, 10470 and 11545.
**B.S.A.** No. 48.
**LIBBY** 4R Capstan.
**HERBERT** 2S Capstan.
**JONES & SHIPMAN** H/Spd. Bench Drill.
**FOSDICK** 3 Sp. Drill.
**CHURCHILL** No. 1 Planetary Grinder.
**BROWN & SHARPE** No. 5 Plain Grinder.
**SCRIVENER** 1CA Centreless Grinder.
**SCRIVENER** No. 1 Controlled cycle Centreless Grinder.
**SMART & BROWN** Internal Grinder.
**PRECIMAX** 6in. by 12in. Plain Grinder.
**JONES & SHIPMAN** 10in. by 27in. Grinder. Universal.
**SUPERIOR** Surface Grinder.
**DRUMMOND MAXICUT** No. 2 Gear Shaper.
**TRIUMPH** Centre Lathe.
**WARNER & SWASEY** 2A Turret Lathe.
**LEBLOND** No. 15 RP Lathe.
**SOUTHBEND** Taper Turning Lathe. 7in. Centre.
**ADCOCK & SHIPLEY** 0-1 and No. 3 Hor. Mills.
**VAN NORMAN** Plain Mill.
**VAN NORMAN** No. 3 Uni. Mill.
**MILWAUKEE** Simplex 12/24 Mill.
**CINCINNATI** Model 08 Vertical Mill.
**KELLER** 1210 Diesinking Machine.
**CINCINNATI HYDROTEL** 28in. Vert Mill.
**MOREY** 12M 2 Sp. Profiler.
**TAYLOR & CHALLEN** 14B Press.
**KITCHEN & WADE** No. 2 Honing Machine.
**SENTINEL** 25T Power Press.
**SENTINEL** 12 ton Power Presses.
**H.M.E.** Model L.6 Power Presses (6 ton cap.).
17in. **ALBA** Shaper.
**HEENAN & FROUDE** Dynamometer.

**LATE AMERICAN MACHINES**
**GLEASON** 3in. Str. Bevel Gear Generators.
**GLEASON** 12in. Str. Bevel Gear Generators.
**FELLOWS** 7125 High Speed Gear Shapers.
**FELLOWS** 72 High Speed Gear Shaper.
**FELLOWS** No. 7 High Speed Gear Shaper.
**FELLOWS** 75A High Speed Gear Shaper.
**FELLOWS** 61A Gear Shaper.
**HEALD** 72A3 Internal Grinder.
**GLEASON** No. 16 Spiral Bevel Hypoid Gear Generator.
**K & T** 5H Plain Mill.

All machines motorised 400/3/50 unless otherwise stated.

**GOOD USED MACHINE TOOLS WANTED**

**E. H. JONES**
MACHINE TOOLS LTD.

**48 HIGH STREET, EDGWARE, MIDDX.**
**PHONE EDGWARE 4488/9**

**78 WRENTHAM STREET, BIRMINGHAM 5,** *Phone Midland 5593*

Classified Advertisements (*PLANT FOR SALE, contd.*)

# All Machines on Display in London

## Telephone TATe Gallery 0633/6

NORTON MACHINE TOOLS NORTON MACHINE TOOLS

### AUTOMATICS

*Single Spindle*
B.S.A. 68 ¼in. (Choice of 2.
BROWN & SHARPE OOG.
BROWN & SHARPE OG. (Selection of several.)
BROWN & SHARPE 2G. (Choice of 3.)

*Multi Spindle*
WICKMAN 5 sp. 1⅛in. (Selection of several.)
B.S.A. GRIDLEY 6 sp. 1 in. (Choice of 3.)
GRIDLEY 6 sp. ⅞in. (Choice of 2.)
B.S.A. GRIDLEY 4 sp. ⅝in. (Selection of several.)
CONOMATIC 6 sp. 1¼in.
GREENLEE 6 sp. 1⅜in.

### BORERS

PEARN RICHARDS No. 3 Horizontal
NEWALL No. 0 Jig Borer

### CAPSTAN, COMB. TURRET LATHES

WARD No. 7 Covered bedtype, WTE series and wartime built. (Choice of 2.)
GISHOLT No. 5 Chucker, Power Feeds, 39 to 500 r.p.m.
WARNER & SWASEY No. 3 Bar and Chucking, assorted equipment.
HERBERT No. 1 Air Collet Chuck, bar feed equipment. Speeds 77 to 4,020 r.p.m.
WARD 1A Hand Operated Collet Chuck. Speeds 75 to 4,130 r.p.m.
WARD 10B Comb. Power feed to turret, Ball chuck, Bar feed equipment. Rebuilt.
LIBBY 1H5 Comb. Hole in spindle 5¼in. dia. Power and rapid feeds to saddle turret and cross slide.
WARD No. 7 Comb. Covered bed types. Speeds (1) 13 to 1,530, (1) 18 to 536 r.p.m. (Choice of 2.)

### CENTRE LATHES

SWIFT 13in. by 132in.; 3.6 to 220 r.p.m.
BINNS & BERRY 12¼in. by 90in. S.S. & S.C. NEW.
SPRINGFIELD 12in. by 48in.; 9 to 380 r.p.m.
PROGRESSIVE 11in. by 120in.; 20 to 516 r.p.m.
CARDIFF 8¼in. by 48in. S.S. & S.C. Gap Bed; 20 to 970 r.p.m.
WILSON MK. V 7¼in. by 48in. Gap bed. NEW
CHURCHILL REDMAN 12in. by 20in. Hyd. Copying. Built 1957

### SLOTTERS

BUTLER 24in. Heavy Duty Production Type
BUTLER 12in. With Tilting Table
BUTLER 8in. Rebuilt

### PRESSES

TAYLOR & CHALLEN 20 ton
TAYLOR & CHALLEN 15 ton

### DRILLING MACHINES

*Single Spindle*
POLLARD CORONA Bench Type ⅞in. Cap. Speeds 642 to 12,040 r.p.m. Selection of several.

*Two Spindle*
ARCHDALE, Flange Mtd. Motor 1st sp. No. 2 M.T. 2nd Sp. No. 3 M.T.
HERBERT Type H Junior Sep. Motors 2,000 to 5,600 r.p.m., ½in. Cap.
POLLARD CORONA Model 13CY, Both sp. 2 MT. Flange Mtd. Motors. 1st Sp. 110 to 1,460 r.p.m. 2nd Sp. 460 to 2,945.

*Three Spindles*
POLLARD CORONA Production Type, Each Spindle No. 4 MT.

*Four Spindle*
POLLARD CORONA Model HEF, Bench Type ⅞in. Cap. Speeds 642 to 12,040 r.p.m. Choice of three.
HERBERT Pedestal Type No. 2 and No. 3 MT Power down feed on 1st sp.

### GEAR MACHINERY

GLEASON No. 24 Straight Bevel Generator S/N17920
GLEASON 12in. Single Roll Roughing and Finishing S/N 19744
SYKES Type V.10A Gear Generator. UNUSED
MAAG Model SS.30 Gear Grinder in Excellent Condition.

### GRINDERS

LUMSDEN 24in. dia. Retractable Rotary Table Surface Grinder Model 90RT. With Chuck.
CHURCHILL 12in. by 50in. Hyd. Universal, internal spindle
JONES & SHIPMAN 8in. by 16in. Universal, internal spindle
CHURCHILL Centreless No. 2
MYFORD 5in. by 9in. MG9 Cylindrical
SNOW 72in. by 15in. VB 18 Vert. Spindle Surface
CHURCHILL 42in. swing 120in. bore internal
HEALD Internal Model 81

### SHAPERS

BROOK 18in.
NEWEY 14in.

### MILLING MACHINES

*Universal*
VICTORIA M2, table 45ft. by 11in.; 30 to 1,010 r.p.m.

*Plain Horizontal*
MILWAUKEE 3H, table 64in. by 13¼in.; 20 to 1,000 r.p.m.
ARCHDALE 28in. Power Feeds all directions.
ADCOCK & SHIPLEY Rack Feed Model 00. (Choice of 2.)
ADCOCK & SHIPLEY Rack Feed Model 0. (Choice of 2.)
ARCHDALE 20in. Rapid Production
BROWN & SHARPE table 50in. by 12in.

*Vertical*
CINCINNATI No. 3, Dial Type table 62½in. by 15½in.; 18 to 450 r.p.m.
CINCINNATI No. 2, Dial Type table 52in. by 12½in.; 20 to 500 r.p.m.
VICTORIA VI, table 40in. by 11in. 31 to 1,010 r.p.m.
CINCINNATI 08 Production
ADCOCK & SHIPLEY No. 1 table 37½in. by 10in.; 15 to 1,500 r.p.m.

### VARIOUS

MIDSAW Model D4 deep throat Bandsaw.
TAYLOR TAYLOR & HOBSON 3 Dimensional Die Sinker
RAPIDOR Jig Sawing & Filing Machine, Tilting Table 15in. by 15in.
STEDALL Honer
ROEBUCK Riveter No. 2
WOLF DE Pedestal Grinder
SCIAKY Flash Butt Welder
DENBIGH Nos. 2 and 4 Fly Presses (Selection of several.)
THIEL Tapping Machine.

### NEW MACHINES FOR EARLY DELIVERY

BRONX 40, 60 and 90 ton Press Brake
HEINEMAN 20in., 24in., 28in. and 34in. heavy duty High Speed Shapers also with copying units
COLCHESTER MASCOT Lathes. 8¼in. by 56in.

**We pay generous prices for NEARLY NEW medium and heavy duty Machine Tools**

# W. E. NORTON (MACHINE TOOLS) LIMITED

GROSVENOR GARDENS HOUSE · GROSVENOR GARDENS · LONDON · S·W·1

*Telephone:* TATe Gallery 0633/4/5/6 *Cables:* Norbros, London

Classified Advertisements (*PLANT FOR SALE, contd.*)

# MIDLAND

**BORING MACHINES**

**WEBSTER & BENNETT** 4ft. D Type Vertical Borer.

**BANDSAWS**

**THIEL** No. 17 Metal Bandsaw.

**CROPPING MACHINES**

Angle Cropping Machine. Cap. up to 6in. × ½in. angles.

**DRILLING MACHINES**

**POLLARD** 13in. Pillar Drill. No. 2 Morse Taper. R. & F. Table 11in. × 11in.

**ARCHDALE** 28in. Heavy Duty Pillar Drill. No. 4 Morse Taper.

**GRINDING MACHINES**

NEW **NORTON** 10in., 12in., 14in., 16in. and 20in. D/E Tool Grinders.

**ABRASIVE** 3B 24in. × 8in. Vertical Spindle Surface Grinder.

**CAPSTAN AND CENTRE LATHES**

**LANG** 8½in. × 4ft. 0in. S.S. & S.C. Lathe.

**HAMMERS**

**MASSEY** 5 cwt. Slide Type Pneumatic Hammer. 400/3/50.

**MILLING MACHINES**

**RICHMOND** H.2 Horiz. Miller. Table 35in. × 9in.

**VAN NORMAN** No. 26 Horizontal and Vertical Milling Machine. Slotting head.

**MILWAUKEE** 3.H Vertical Milling Machine.

**PRESSES**

**TAYLOR & CHALLEN** 845 Dial Feed Notching Press.

**BRADLEY & TURTON** No. 3 Flypress.

**SWEENEY & BLOCKSIDGE** Bench Press. Capacity 3 tons.

**SCREWING MACHINES**

**KENDALL & GENT** 3in. Screwing Machine. Leadscrew type.

**POLISHING MACHINES**

3 and 5 h.p. Double Ended Polishing Spindles.

**SLOTTING MACHINES**

**ORMEROD** 12in. Stroke Slotting Machine.

All machines 400/3/50 electrics unless otherwise stated.

**THE MIDLAND MACHINE TOOL CO.**

**BRADLEY, BILSTON, STAFFS.**

Tel.: Bilston 42471/9.

---

**NOBLE & LUND** 11in./16in. Fluidfeed Cold Sawing Machine with fluid grip vice. Capacity 5in. dia. rounds, 4½in. squares. 3 speeds. 5 h.p. 400/3/50.

**HULLER** No. 2 Bench Model Tapping Machine, ½in capacity, finest pitch cut 60. Spindle speeds 500-1,000-2,000 r.p.m. 400/3/50.

**TAYLOR & CHALLEN** B3½ Geared Power Press. Fixed Stroke 4in. 60 tons pressure, Bed area 30½in. × 26½in. Motorised 400/3/50. Operators' Guards.

**BRONX** Series 68, 60 ton Press Brake. Capacity 8ft. × ¼in. m.s. Between uprights, 3in. Stroke, 6 h.p. main motor drive, 400/3/50. New machine, early delivery.

**SWEENEY & BLOCKSIDGE** No. 9 Geared Power Press. Pressure 20 tons, Adjustable Stroke 1in. to 3in. Bed area 26in. × 22½in. Motorised 400/3/50. Operators Guards.

**WILSON** "Newel" 7½in. Centre Lathe. S.S. & S.C. All Geared Head, Quick Change Gear Box. Distance between centres 32in. 9 spindle speeds 26-477 r.p.m. Motorised 400/3/50. Machine complete with 3-jaw chuck, faceplate, travelling steady.

**H.M.E.** Type C.26 Double Sided Geared Power Press. 100 tons pressure, 5in. Stroke, Bed area 24in. × 22in. Between sides 24in. Motorised 10 h.p. 400/3/50.

**MILWAUKEE** 1H Plain Horizontal Milling Machine. Table working surface 40in. × 9in. Rapid traverse all ways. 16 spindle speeds 35 to 1,400 r.p.m. 400/3/50.

**ASQUITH** EGC 6ft. Girder Type Radial Drilling Machine. Spindle Bored No. 5 M.T. 6 spindle speeds 220-905 r.p.m. 4 auto feeds. 400/3/50.

## STANCROFT LTD.,

**LANCASTER STREET, BIRMINGHAM, 4**

ASTon Cross 2235

---

**Precimax Cylindrical Grinding** Machine. Size 6in. × 12in. Model H.U.P.1 Motor driven workhead swivels 90 deg. Electrics 400/3/50.—BOX C924, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**For Sale, One 2A Ward Capstan,** High Speed.—BOX C926, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Huller UG3 Tapping Machine,** 1955. 400/3/50.—BOX C902, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Dean, Smith & Grace Lathe,** 9in. height × 36in. between centres. 2in. dia. spindle bore. 1 to 490 r.p.m. 5 h.p. motor 400-440/3/50.—BOX C905, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Kitchen & WADE H3 Horizontal** Boring and Drilling Machine complete with Indexing Table.

Further details from:—
C. & G. OLDFIELD LTD.,
15, Abercorn Street,
PAISLEY.

---

**Churchill H.B.B. Internal Grinder.** 4 faceplate speeds 98-350 r.p.m. Max. faceplate swing 15in. 3 h.p. motor, 400/3/50.—BOX C928, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Churchill 10in. × 24in. Universal** Grinding Machine (1944). With steadies, etc. Reconditioned.—BOX C549, MACHINERY, Clifton House, Euston Road, N.W.1.

---

# GATE

**MACHINERY CO., LTD.**

**176/178, Victoria Road, Acton, LONDON, W.3. ACOrn 8881**

**GRINDERS**

**BROWN & SHARPE** No. 2 Surface Grinder.
**STUDER** Model PSM1.50 Profile Grinder. This machine is in excellent condition.
**HORTSMAN** Thread Grinder, capacity 5in. dia. × 9in. b.c.
**BROWN & SHARPE** No. 5 Cylindrical Grinder.
**FRITZ WERNER** Model 270A Cylindrical Grinders, 3½in. × 7in. b.c.
**BROWN & SHARPE** No. 13 Universal Grinder.
**BRYANT** No. 5 Heavy Duty Internal Grinder.
**BENTLEY** Form Cutter Grinder.

**LATHES, CAPSTANS, AUTOMATICS**

**BOYES & EMMS** S.S. & S.C. Lathe, centre height 16in. × 7ft. 6in.
**ROLLO** 6½in. Centre Lathe.
**SWIFT** Hydraulic Copying Lathe, 36in. swing × 5ft. 6in. b.c., 30 h.p. drive.
**HENDY** 13in. × 30in. S.C. Lathe.
**RIVET** 4in. × 18in. b.c. Precision Lathe.
**LE BLOND** 14in. × 24in. S.C. Lathe.
**BOLEY LEINEN** L.4 2nd Operation.
**WARNER & SWASEY** No. 3 Capstan

**MILLERS**

**ARCHDALE** 48in. Heavy Duty Automatic Horizontal Mill, speeds 38-313.
**CINCINNATI** 1-18 Production Miller.
**KENDALL & GENT** Vertical Miller, table 69in. × 19in., speeds 20-300, rapid traverses.
**BROWN & SHARPE** No. 2 Vertical Mill, table 54in. × 14in., speeds 30-1,200 r.p.m. Power down feed to head.
**SCHIESS DEFRIES** Vertical Keyseater.
**MAMMUT** 10in. × 23in. Table Horizontal Mill, hand lever operated.
**FRITZ WERNER** 10in. × 34in. Horizontal Mill.
**BROWN & SHARPE** No. 2 11in. × 49in. Horizontal Mill, speeds 15-376. Feeds 3/10-15 I.P.M.

**PRESSES, SHAPERS, PLANERS AND HOBBERS**

**CHURCHILL-REDMAN** 32in. Stroke Heavy Duty Shaper. Excellent condition.
**ESSEX** No. 32 Punch Shaper.
30-ton **RASKIN** Double Sided Double Geared Drawing Press. Area 20in. × 23in. Draw 4½in.
**MAXICUT** High Speed Gear Shaper, max. dia. 7in. × 2in. face.
New **POREBA** Model HDA.80 Planer, capacity 10ft. × 32in. × 30in. table, drive by Heid gearbox.
**DOWDING** V8 Gear Hobber. Max. pitch in steel one cut 14 D.P.; in soft metals one cut 12 D.P. Max. dia. 0in.-8in. No. of teeth cut 6-400. Length of hobbing traverse 7½in. Hob spindle speeds (10) 61-246 r.p.m.

**DRILLS**

**BOLEY** Multi Drill V8 10in.
**CORONA** 13in. 2AP Sensitive Pedestal Drill.
**CORONA** 20in. Pedestal Drill.
15HEF 4 Spindle Drill.

**MISCELLANEOUS**

**CANNING** Double Ended and Centreless Polishing Machines.

Classified Advertisements (*PLANT FOR SALE, contd.*)

# RING BELLS *for machine tools*

LEEDS 63-7398

KEARNS OA Horizontal Borer. Built 1943. With top table 36in. square; 2½in. travelling spindle and 14in. dia. facing head. M.D. 400/3/50.

**NEW DENBIGH** 24in. Back Geared High Speed Drill. Cap. up to 1¼in. in steel. No. 3 M.T. M.D. 400/3/50.

**EDWARDS** 9ft. by 16's gauge Folding Machine.

**PRECIMAX** Model M.P.J. 12in. by 36in. Plain Hydraulic Grinder. Admits 24in. dia. grinding wheels. M.D. 400/3/50.

**PRECIMAX** Vertical Spindle Surface Grinder. Cap. 16in. by 48in. With 18in. segmental wheel. Magnetic chuck: 15in. by 48in. M.D. 400/3/50.

**GISHOLT** No. 4 Bar Feed Capstan. Swing. over hardened strip bed 19¾in. Collet cap. 2¼in. With draw-in collet chuck; bar feed; tooling. M.D. 400/3/50.

**LANG** 8¼in. S.S. & S.C. Lathe. Swings 17in. over straight V-bed. Admits 48in. between centres. Speeds 19-900 r.p.m. M.D. 400/3/50.

**BROWN & SHARPE** 2B Plain Miller. Table size 51¼in. by 11¼in. Rapid power feeds 3 ways. 16 speeds 30-1,200 r.p.m. M.D. 400/3/50.

**CINCINNATI** 2/18 Production Miller. Table 36in. by 9in. working surface. Two-way cycle. Speeds 30-1,200 r.p.m. M.D.400/3/50.

**AJAX** Bench Drill. No. 2 M.T. T-slotted table 12in. by 12in. with 1 T-slot. 3 speeds 550-2,900 r.p.m. M.D. 400-440/3/50.

**ASQUITH** 5ft. O.D.I Radial Drill. No. 5 M.T. 12 speeds 22-580 r.p.m. M.D. 400/3/50.

**AVEY** 2-spindle Drill. No. 2 M.T. Table 22in. by 12¼in. Speeds by cone pulley drive by 2 H.P. motor 220-440/3/50.

**BROWN & SHARPE** No. 10 Plain Cylindrical Grinder. Cap. 6in. by 18in. Table 41in. by 7in. M.D. 400/3/50.

**PRECIMAX** Model U.P.J. Universal Grinder. Cap. 12in. by 60in. Plunge feed to wheelhead.

**WILLSON** 8¼in. S.S. & S.C. Lathe. Admits 6ft. between centres and 28in. in gap. Speeds 26-477 r.p.m. M.D. 400/3/50.

**WARD** 7B Combination Turret Lathe. Covered bed ways. 8 speeds-50-1,000 r.p.m. Spindle bore 2¾in. V-belt drive 400/3/50.

**HERBERT** No. 7 Junior Combination Turret Lathe. Swing over bed 17¼in. Speeds 45-767 r.p.m. M.D. 400/3/50.

**PRECIMAX** Model MPO 5in. by 18in. Plain Grinder. Hydraulic plunge feed to head and hydraulic feed to table. Admits 18in. dia. by 2in. dia. wheel. M.D. 400/3/50.

## *H. BELL (Machine Tools) LTD., Walter Street, LEEDS 4.*

## Edwards

**HORDERN, MASON & EDWARDS** Type L20 Inclinable Power Press. Motorised for 400/3/50 supply. Pressure exerted approx. 20 tons. Stroke adjustable from ⅛in. to 3½in. Bed 23in. × 14½in. Hole in bed 9½in. diameter. Weight approx. 29 cwt.

**TAYLOR & CHALLEN** No. 4½TDP Double Sided Double Geared Double Action Toggle Drawing Press. Can be supplied motorised for 400-440/3/50 supply. Punch stroke 14½in. Blankholder stroke 7in. Bed 21½in. × 25½in. Clear hole in bed 12in. diameter. Weight approx. 106 cwt.

TWO NEW LEN40/250 Open Fronted Inclinable Power Presses. With adjustable stroke. Motorised for 400-440/3/50 supply. Pressure exerted 40 tons. Depth of throat 9½in. Adjustment of stroke ⅛in. to 3⅛in. Table 18½in. × 25⅝in. Hole in table 8½in. dia. Weight approx. 58 cwt.

TWO NEW LEN25/220 High Speed Open Fronted Inclinable Power Presses. With adjustable stroke. Motorised for 400-440/3/50 supply. Pressure exerted 25 tons. Depth of throat 8⅛in. Table 16½in. × 22⅝in. Hole in table 8½in. Stroke adjustable from ⅛in. to 3⅛in. Weight approx. 35 cwt.

**BESCO** High Duty Double Geared Guillotine Shearing Machine. Motorised for 400-440/3/50 supply. Capacity 72in. × ¼in. mild steel plate. With automatic hold-down and front, back and side gauges. Complete with one spare pair of blades. Weight approx. 12½ tons.

**CRAIG & DONALD** Deep Gap Guillotine Shearing Machine. Motorised for 400/3/50 supply. With automatic hold-down and adjustable back gauge. Capacity 14ft. × ¼in. Complete with three spare sets of blades. Weight approx. 11 tons.

**RUSHWORTH** Power Operated Double Geared Open Ended Guillotine Shearing Machine. Motorised for 230/1/50 supply. Capacity 4ft. × ¼in. With automatic sheet hold-down and adjustable front, back and side gauges. Weight approx. 50 cwt.

Photographs of the above are available.

**VERY FAVOURABLE HIRE OR HIRE PURCHASE TERMS CAN BE OBTAINED**

MACHINE TOOLS, NEW AND USED, Of Every Description. Attractive Prices.

**F. J. EDWARDS LTD.,**
**359-361, EUSTON RD., LONDON, N.W.1**
*Telephone: EUSTON 5000. Telex 24264.*
**And at Lansdowne House, 41, Water St., Birmingham, 3.** *Telephone: Central 7606-8*

**11in. Centre Churchill-Redman** Model 11NM M/d all-geared hollow spindle (3⅛in.) S.S. & S.C. Lathe, with taper turning attachment, on 13ft. 3in. gap bed Admits 8ft. 6in. b.c. and 38in. dia. in gap, 16 speeds 14-408 r.p.m. Norton type gearbox.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

**Index Model OR12, ON12 and O** High Speed Single Spindle Automatics, 400/3/50.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

**Planer, 18ft. × 4ft. 6in. × 4ft. 6in.** cap., Lanes. Dynamo drive.—BOX C921, MACHINERY, Clifton House, Euston Road, N.W.1.

## HIGH QUALITY USED MACHINE TOOLS

Used **PRECIMAX** Type UPJ 12/72 Hydraulic Universal Cylindrical Grinding Machine, with variable speed workhead and electrics to suit 400/3/50.
Used **CINCINNATI** No. 2 Tool and Cutter Grinding Machine. 400/3/50.
**HERBERT** No. 12 Heavy Duty Combination Turret Lathe. Full chucking equipment. 400/3/50.
**TOWN** 28in. Vertical Spindle Drilling Machine. Compound table. 400/3/50.
**K. & W.** 33in. Sensitive Radial Drilling Machine. Swing-aside table, swing-aside arm. 400/3/50.
**JONES & SHIPMAN** 20in. Vertical Drilling Machine. No. 4 Morse Taper. Power feed. 400/3/50.
**KEARNS** No. 2 Standard Horizontal Boring Machine with facing head and sliding spindle. 400/3/50.
**SNOW** T20 Table Surface Grinding Machine.
**ARCHDALE** 28in. Horizontal Manufacturing Milling Machine, with power and rapid feeds. Table size 49in. × 30in. 400/3/50.

WE UNDERTAKE REBUILDING OF ALL TYPES OF MACHINE TOOLS

**CENTAUR TOOL WORKS,**
**EYRE STREET, SPRING HILL,**
**BIRMINGHAM, 18.**
Tel.: EDGbaston 1118 & 1119 'Grams: Capstan, Birmingham

**Corona Heavy Duty Vertical** Drilling machine. No. 5 Morse Taper Excellent condition.
Further details from:—
C. & G. OLDFIELD, LTD.,
15. Albemarle Street,
PAISLEY.

**Herbert Carbicut Lathe, 16** spindle speeds 445 to 3,025 r.p.m. 3 feed changes 70, 105, 140. 1¼in. dia. spindle bore. 5 h.p. motor. 400-440/3/50.—BOX C910, MACHINERY, Clifton House, Euston Road N.W.1.

**Libby 4R Turret Lathe, 12** spindle speeds 27 to 725 r.p.m. Power traverse to saddle and turret. With 10in. 3-jaw chuck, fourway toolpost, 2 piloted multi-knee toolholders, 4 small extensions, suds pump, 400/3/50.—BOX C916, MACHINERY, Clifton House, Euston Road, N.W.1.

**Gisholt No. 3 A.G.H. Turret** Lathe. 2¼in. spindle bore, 1,460 r.p.m. Motor 400/3/50.—BOX C920, MACHINERY, Clifton House, Euston Road, N.W.1.

**Acme-Gridley Single Spindle** L 2¼in. Auto, motorised, collets, toolholders, etc., also Brown & Ward 1¼in. 4-op. with threading spindle, mot. Ex. Condition, equipment.—C. L. THOMAS, LTD., Stirling Road, Solihull. Tel.: 3075-6.

**Mayer & Schmidt Hydraulic** Vertical Honing Machine. Type P.H.E., 6¼in. × 48in., motorised 7½ h.p. 400/3/50.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

**Wickman Erodosharp for Re-**servicing Carbide Tools.—A. McNAMARA & CO., LTD., New Line, Bacup, Lancs. 'Phone: Bacup 946.

**Hilmor Motor Driven Tube** Bending Machine for sale. Mandrel type. Maximum capacity: copper tubes 2¼in. bore × 10 gauge; steel tube 2in. o.d. × 10 gauge; conduit 2in. O.D.; gas and steam tubes 1¼in. nominal bore. Arranged motor drive 400-440/3/50.—F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham 3.

*When answering advertisements kindly mention MACHINERY.* R2

Classified Advertisements (*PLANT FOR SALE, contd.*)

## Newman

**AUTOMATICS**

**BULLARD** Multi-Au-Matic 7in. 8 spindle.
**BULLARD** Multi-Au-Matic 12in. 6 spindle.

**BORING MACHINES**

**KEARNS** Model OC Horizontal Boring Machine, 3in. dia. travelling spindle.
**ROCCO** Model AL55D Horizontal Boring and Facing Machine, 2½in. dia travelling spindle. (NEW.)
**KEARNS** No. 4 Horizontal Boring and Facing Machine, 4in. dia. travelling spindle, with extended traverse.
**KEARNS** No. 4 Horizontal Boring and Facing Machine, 4in. diameter travelling spindle.
**WEBSTER & BENNETT** Vertical Boring Machine, table 50in. diameter.
**RICHARDS** Type PRT Horizontal Floor Boring Machine, 3½in. travelling spindle, 28in. diameter facing head.
**GIDDINGS & LEWIS** No. 45 Horizontal Boring, Machine, 5in. diameter travelling spindle.

**CAPSTAN AND CENTRE LATHES**

**CHURCHILL REDMAN** Model 13 NM Heavy Duty S.S. & S.C. Gap Bed Centre Lathe, 13in. centre height × 72in. between centres. Swing in gap 50in.
**MITCHELL** Model DM10 S.S. & S.C. Gap Bed Centre Lathe, 10½in. centre height × 7ft. 5in. between centres. (NEW.)
**OLDFIELD & SCHOFIELD** Surfacing and Boring Lathe, 10½in. centre height.
**WARD** 7B Combination Turret Lathe.
**HERBERT** No. 12 Combination Turret Lathe, 6½in. diameter hollow spindle.
**NILES** Heavy Duty Centre Lathe, S.S. & S.C., 17in. centre height × 28ft. between centres.
**U.L.E.O.** Heavy Duty Centre Lathe, 16in. centre height × 30ft. between centres.

**DRILLING MACHINES**

**HETTNER** Radial Drilling Machine, 10ft. elevating arm.
**TOWN** 30in. Single Spindle Boring and Drilling Machine.

**GEAR MACHINES**

**ORCUTT** Model HM24 Hydraulic Internal Gear Grinder.
**GLEASON** 8in. Straight Bevel Gear Generator.

**GRINDING MACHINES**

**LANDIS** Type C Plain Hydraulic Cylindrical Grinding Machine, 6in. swing × 18in. between centres.
**LANDIS** Plain Hydraulic Cylindrical Grinding Machine, 18in. swing × 72in. between centres.
**ORCUTT** Model HM24 Internal Spur Gear Grinding Machines.
**CHURCHILL** Plain Hydraulic Cylindrical Grinding Machine, 20in. swing × 72in. between centres.
**BROWN & SHARPE** Plain Cylindrical Grinding Machine, 10in. swing × 36in. between centres.

**MILLING MACHINES**

**CINCINNATI** No. 3 High Speed Dial Type Vertical Milling Machine (1950).
**CINCINNATI** Model 5/72 Plain Hydromatic Milling Machine, table 91in. × 22in. (1952).
**CINCINNATI** No. 2L Plain Horizontal Milling Machine, table 52in. × 10in.
**CINCINNATI** No. 1M Vertical Milling Machine.
**CINCINNATI** No. 4 Dial Type Horizontal Milling Machine.
**GRAFFENSTADEN** Model F1101 Plain Horizontal Milling Machine, table 52in. × 10in.
**PRATT & WHITNEY** Model BL3620 3-spindle "Keller" Die Sinking Machine.
**CENTEC** Model 3R Automatic Production Milling Machine, table 25in. × 16in.

**MISCELLANEOUS**

**RUSSEL** Model 26/28 Hydrofeed Cold Sawing Machine.
**LANGE & GAILEN** 28in. stroke Double Headed Hydraulic Shaping Machine.
**TAYLOR & CHALLEN** Double Sided 50-ton Geared Power Press, 10in. stroke.

## NEWMAN INDUSTRIES LIMITED,

**Machine Tool Division: YATE, BRISTOL**

Tel.: Chipping Sodbury 3311. Telex. 44121. Cables: "Dynamo Yate."
London Office: Terminal House, Grosvenor Gardens, S.W.1. Tel.: Sloane 8206. Telex 23289.

## TWW

**EXCEL** No. 2 Hand Operated Horizontal Spindle Surface Grinding Machine, cap. 14in. × 6in., with Eclipse non-electric magnetic chuck. Spenstead dust collecting unit.
**JONES-SHIPMAN** Model 540 Hydraulic Surface Grinding Machine, 6in. × 18in. cap., with electrically driven suds pump tank and piping.
**HUNT** 18in. × 6in. Horizontal Spindle Surface Grinding Machine, with 18in. × 6in. magnetic chuck, power traverses longt. and transverse, dust extraction equipment.
**BROWN & SHARPE** No. 2 Horizontal Spindle Surface Grinding Machine, table working surface 18in. × 6in., power traverse.
**HOBOROUGH** Model 2BE Horizontal Spindle Surface Grinding Machine, 18in. × 6in. cap., power longt. traverse.
**B.S.A. LANDIS** Type C Hydraulic Plain Cylindrical Grinding Machine, 6in. × 30in. cap., 20in. dia. × 2in. face wheel, electric suds pump and fittings.
**NEWALL** Type L Hydraulic 10in. × 36in. Cap. Plain Cylindrical Grinding Machine, electric suds pump, 19in. grinding wheel.
**B.S.A.** No. 7 Centreless Grinding Machine, arranged for plunge grinding, max. grinding dia. 3in., min. grinding dia. ½in., size of grinding wheel 14in. × 4in., complete with rest and ejector mechanism, suds equipment.
**JONES & SHIPMAN** Model 753 8in. × 20in. Universal Precision Grinding Machine, power traverse to table, complete with internal grinding attachment, suds pump and piping.
**NORTON** 12in. × 36in. Hydraulic Universal Grinding Machine, electrically driven suds pump, internal grinding attachment, steadies

## THOS W. WARD LTD.
## ALBION WORKS · SHEFFIELD

'Phone: 26311. Ext. 347.

*Remember - WARDS might have it!*

---

**Churchill H.B.A. Internal Grinder.** Automatic hydraulic cycle. Faceplate speeds 98, 158, 238, 350 r.p.m. 12½in. facepiate. Max. hydraulic traverse 18in. variable feed. Motorised coolant system built-in. Fully motorised 400-440/3/50.—BOX C925, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Essex No. 32 Punch Shaper.** Adjustable stroke 52, 36 and 65 strokes per min. Swivel of tool adjustment 0-90 deg. The Dividing Head can be fitted to either the top or bottom "T" slot on the cross slide. In "as new" condition.—BOX C935, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**No. 2 Edgwick Vertical Milling** M/c., dial type. Table 46in. × 11in. Long. traverse 28in. Auto rotary table. Speeds 37-605 r.p.m. S.C. motor.—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone 84642.

---

**Herbert No. 4BS Capstan Lathe.** Full Turret Equipment, etc. Further details from:—

C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

---

**Wickman 10mm. Sliding Head** Automatic, 400/3/50. Drilling attachment.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

## DOUGLAS
## OF HIGH WYCOMBE

## SECONDHAND MACHINES FOR IMMEDIATE DELIVERY

**LATHES**

**HALIFAX** 5in. S.S. & S.C. Lathe. £110
**HERBERT** SMALLPIECE No. 9 W.S.L. Multicut Production Lathe. £345
**HERBERT** N.D. 8in. S.S. & S.C. Lathe. £190
**LANG** 8½in. S.S. & S.C. Lathe. £575
**LANG** 7in. High Speed Finishing Lathe. £450
**MYFORD DRUMMOND** 3½in. Lathe. £35
**SOUTHBEND** 4½in. Bench Lathe. £65
**ZBROJOVKA** 7½in. S.S. & S.C. Lathe. £1,200

**GRINDING MACHINES**

**CHURCHILL** Rotary Surface Grinder (12in. dia. rotary magnetic chuck). £420
**EAGLE** Surface Grinder, Model 2A (hand feeds). £170
**JONES & SHIPMAN** Portable Toolpost Grinder. £30
**LUMSDEN** Vertical Grinder, Size 91 (36in. rotary magnetic table). £750

**MILLING MACHINES**

**CINCINNATI** No. 3 Sliding Head Vertical. 63in. × 15in. table. £750
**HERBERT** 16V Sliding Head Vertical, 57in. × 13in. table. £275
**MINGANTI** FVM3 Sliding Head Vertical, 62in. × 15in. table. £1,425
**MILWAUKEE** No. 2 Horizontal, 50in. × 14in. table. £475
**PARKSON** 2P Plain Horizontal, 52in. × 12in. table. £400
**VICTORIA** JUNIORMIL Plain Horizontal, 28in. × 7in. table. £310
**ADCOCK & SHIPLEY** Thread Milling Machine, 4½in. dia. × 12in. cap. £100

**PRESSES**

No. 1 Fly Press. £7 10s.
No. 2 Fly Press. £13
**BESCO** Bench Power Press (unmotorised) (4 ton pressure). £40

**SHAPING AND PLANING MACHINES**

**NEW ENGLAND** 10in. Stroke Shaper. £70
**BUTLER** Planing Machine, 9ft. × 2ft. 6in. table. £1,100

**ELECTRIC MOTORS**

(all 400-440/3/50 cycles supply except where otherwise stated)

**HOOVER** ¼ h.p.—½in. dia. spindle. £4 10s.
**HOPKINSON** ¼ h.p.—½in. dia. spindle. £6 10s.
**HUGH SCOTT** 1 h.p.—½in. dia. spindle. £7 10s.
**ENGLISH ELECTRIC** 2 h.p.—½in. dia. spindle. £9
**BROCK** 2 h.p.—1½in. dia. spindle (single phase). £15
**CROMPTON PARKINSON** 3 h.p.—1in. dia. spindle. £12
**HOWELLS** 3 h.p.—1½in. dia. spindle. £10
**ENGLISH ELECTRIC** 3 h.p.—1½in. dia. spindle. £17 10s.
**METROPOLITAN VICKERS** 5 h.p.—1½in. dia. spindle. £15
**DYNAMO & MOTOR REPAIRS** 5 h.p.—1in. dia. spindle. £15

THIS LIST DOES NOT INCLUDE THE MANY NEW MACHINES THAT ARE AT PRESENT IN OUR SHOWROOM AT HIGH WYCOMBE. WHY NOT VISIT US TO INSPECT OUR RANGE?

## A. DOUGLAS CO., LTD.,
**LINCOLN ROAD,**
**CRESSEX INDUSTRIAL ESTATE,**
**HIGH WYCOMBE, BUCKS.**

Tel.: High Wycombe 4390 (5 lines).

# R. O. GRAY

**WICKMAN** 1¼in. 5-Spindle Bar Automatic, well equipped turret tools, collets, bar feed.

**HERBERT** 1¼in. Single Spindle Bar Automatic, with equipment.

**DISKUS** Vertical Spindle Surface Grinder. Table 53in. by 10in. Hydraulic feeds, 12in. dia. segmental wheel.

**CHURCHILL** Model "O" Universal Tool and Cutter Grinder, 8in. by 16in.

**EDGWICK** No. 1 Keyseating Machine.

**BROWN & SHARPE** No. 2 Universal Milling Machine. Table W.S. 46in. by 10in. Spindle speeds 30-1,300 r.p.m. Vertical attachment, slotting attachment, universal dividing head, rotary table, etc.

**CINCINNATI** 0.8 Vertical Milling Machine. Table W.S. 20in. by 6in. Spindle speeds 150 to 1,300 r.p.m.

**THREE HERBERT** O.V. Vertical Milling Machines, swivel head. Table W.S. 18in. by 5in. Spindle speeds 250-2,000 r.p.m.

**ARCHDALE** 28in. Plain Horizontal Milling Machine. Table W.S. 49in. by 13in. Power feeds and rapid traverse.

18in. **EDGWICK** Plain Horizontal Milling Machine. Table W.S. 26in. by 7in.

**TRIDENT** V.O. Swivel Head Vertical Milling Machine, table W.S. 30in. by 8in.

**DRUMMOND** Model K Capstan Lathe, arranged for chucking. 2 5/16in. Hollow Spindle.

**GISHOLT** No. 4 Capstan Lathe, arranged for chucking, 2½in. Hollow spindle.

**TURNER** 1¼in. Capstan Lathe, with bar feed.

**TWO HERBERT** No. 2B Capstan Lathes, one with bar feed, one arranged for chucking.

**HERBERT** No. 1S Capstan Lathe, chucking.

**KITCHEN & WADE** Heavy Duty Vertical Drill. Spindle bored No. 4 M.T. 24in. dia. rise and fall table, swings round column.

**TWO HILLE** two-spindle drilling machines. Power feed and independent motor to each spindle, fitted ¾in. drill chuck. W.S. Table 21½in. by 9in.

**ARCHDALE** 6ft. Radial Drill, No. 5 M.T. Tee slotted low base 4ft. by 6ft.

**THIEL** No. 6 Radial Arm Tapping Machine, ¾in. Whit.

**SUPERIOR** Vertical Tapping Machine, ½in. Whit.

**JONES & SHIPMAN** "Electrotap".

**ALBA** 18in. Crank Shaping Machine.

**SIX TURNER** Spin Riveting Machines. Type RS5.

**CANNING** Centreless Polishing Machine, with motorised dust extractor.

**EDWARDS** 4ft. by 14G Power Guillotine.

**TAYLOR & CHALLEN** 10-Ton Inclinable Power Blanking Press, ½in. stroke.

**CARSTENS** 4½in. SS & SC Toolroom Lathe, fully equipped with chucks, collets, etc.

**DEAN, SMITH & GRACE** 24in. Swing Boring and Surfacing Lathe, 3in. Hollow Spindle. Hexagon turret on compound slide rest.

**CHURCHILL-CUB** 5in. Lathe. Admits 24in. between centres.

**GLASS** 9½in. by 10ft. 6in. S.S. & S.C. Gap Bed Lathe. 2 5/16in. Hollow Spindle, swing in gap 30in. dia. Admits 6ft. 6in. between centres.

**TWO COULTER** Vertical Spindle Fine Boring Machines.

**PEARN-RICHARDS** No. 2 Horizontal Boring and Facing Machine. Dia. of facing head 20in. With vernier height gauge and boring bars.

**KEARNS** No. O.A. Production type Horizontal borer with 2½in. dia. traversing spindle.

**TWO T.M.A.** Engraving Machines. With Copy Holder.

All machines self-contained drive. 400/440 volts, 3 phase, 50 cycles.

R. O. Gray

**4/6, MINERVA ROAD, PARK ROYAL, LONDON, N.W.10,**
**Telephone: ELGar 4841/4842**

Classified Advertisements (*PLANT FOR SALE, contd.*)

# HELIOT

**35 GREENWICH CHURCH ST.**
**LONDON. S.E.10 GRE.1222**

### CAPSTAN LATHES

HERBERT No. 4 Senior.
WARD No. 7 Chucking, covered bed.
WARD 3A 1¼in. capacity, chucking, power feeds to saddle and turret.

### TURRET LATHES

WARD No. 8, covered bed.
WARD No. 16, covered bed, 8¼in. spindle. 32in. 4-jaw chuck, rapid and power feeds to saddle, cross slide and turret, power rotating turret, spindle speeds 7-225 r.p.m., 50-h.p. motor.
WARD No. 10B, covered bed, 4¼in. spindle, power rotating turret, power and rapid feeds to turret only, collet head and bar feed.

### DRILLING MACHINES

CORONA No. 28AN Production.
AVEY 2-spindle drill, pedestal base, ½in. capacity.
ASQUITH O.D.1 5ft. Radial with loose box table.

### HORIZONTAL MILLERS

PARKSON No. 3J Plain.
HERBERT No. 3ND Plain.
SUNDSTRAND No. 2 Electro Mill. Auto cycle 12in. × 54in. table.
EDGWICK No. 2, 11in. × 42in. table, No. 40 steep taper.
JONES & SHIPMAN duplex slot miller, hydraulic feed.

### VERTICAL MILLERS

WADKIN high speed for light alloy, 16in. × 40in. table.

### GRINDING MACHINES

ARTER 12in. Ring Grinder.
LANDIS 10in. × 24in. universal hydraulic cylindrical grinder.
B.S.A.-LANDIS 6in. × 18in. plain hydraulic cylindrical grinder.
CHURCHILL HBB hydraulic internal grinder, autosizing.
ABWOOD carbide tool grinder.
ROWLAND 18in. double-ended disc grinder.
BROWN & SHARPE No. 2 Surface Grinder, 18in. × 6in.

*All machines motorised 400/3/50 unless otherwise stated.*

---

**Bryant No. 24-36 Hydraulic** Internal Grinder complete with Hydraulic Wheel Dressing device, Spindle, etc.

Further details from:—
C. & G. OLDFIELD, LTD.
15, Abercorn Street,
PAISLEY

---

**Cam or Profile Copy Milling** Machines for diameters up to 20in. or areas up to 18in. × 22in. Also Rotary End Profile Miller. All 400/3/50.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

---

**Reed Prentice No. 5 Vertical** Milling Machine, Table 68in. × 16in. 18 Spindle Speeds 17-600 r.p.m. Excellent condition.—Further details from:—

C. & G. OLDFIELD, LTD.,
15. Abercorn Street,
PAISLEY.

---

**Landis 12in. × 36in. External/** Inttrnal Grinding Machine with Excello Internal Spindle. Chucks and Steadies. Good condition. If interested telephone Mr. GANDER, Byfleet 43252.

---

# GAIR OF MANCHESTER

## NEW EX. STOCK

**W. H. & S.** 36in. Open Sided Planer-Shaper. Table 24in. wide. 10 H.P. drive.

**W. H. & S.** 60in. Swing Surfacing, Boring and Screwcutting Lathe. 10 H.P.

### DRILLING MACHINES

**'ARBOGA'** All geared. 8 speeds. 1in. capacity (Bench).

**'PROGRESS'** No. 1S Pillar. ½in. Capacity.

**'PROGRESS'** No. 16 Bench and Pillar. ½in. Capacity.

GAIR MACHINE TOOLS LTD.
4 CHEPSTOW STREET
MANCHESTER 1
Telephone: Central 2442

---

## SELECTED MACHINES

**SOMUA** Horizontal Milling Machine, table 67in. × 14¼in., spindle speeds 32 to 1,250 r.p.m. No. 50 I.T. 18 feeds ½in. to 10½in. per min., power feeds and rapid traverse in all directions. 1952 machine.

**VICTORIA** P2 Horizontal Mill, table 45in. × 11in., 1959 machine in new condition.

**HERBERT** No. 7A Preoptive Comb. Turret Lathe, 30 to 800 r.p.m. Power feeds to saddle turret, range of turret equipment. ET17978. Good condition.

**WICKMAN** 10mm. Single Spindle Auto. Serial 440046/3942. Four slide head; screwing, combined drilling and tapping and slotting attachments, bar feed. Well equipped.

**HULLER** UG5 Tapping Machine, capacity up to 1¼in., pedestal machine with coolant, controlled pitch. Reconditioned.

**HERBERT** No. 2 Flash Tapping Machines, pedestal Machines, with coolant, controlled pitch. Late type Machines.

All machines motorised 415/3/50.

**A. LAWRENCE & CO., (MACHINE TOOLS) LTD.,**
WELSH HARP, EDGWARE ROAD,
LONDON, N.W.2.
Tel.: GLA 0033.

---

# MARTIN

EMPRESS WORKS, EMPRESS STREET
CORNBROOK, MANCHESTER, 16
*Members of B.A.M.T.M.*
Tel.: Trafford Park 1091-2

### USED MACHINES IN STOCK AVAILABLE FOR IMMEDIATE DELIVERY

**RICHARDS** Duplex 36in. Vertical Borer.
**AMERICAN TOOLWORKS** 4ft. 6in. Radial Drill.
**ASQUITH** 8ft. Radial Drill. 500/3/50.
**GISHOLT** 1L Combination Turret Lathe.
**LANG** 8in. × 48in. S.S. & S.C. Lathe.
**CHURCHILL** 10in. × 24in. Universal Grinder.
**JUNG** 6in. × 18in. Surface Grinder.
**WILSON** 7¼in. × 36in. S.S. & S.C. Lathe.
**ARCHDALE** 30in. Vertical Miller.
**STAMCO** 5ft. × ¼in. Deep Throat Guillotine.

### GUARANTEED REBUILDS

We will rebuild your own machi tools back to makers' specification with 6 months guarantee. We shall be pleased to quote by return.

### NEW MACHINE TOOLS IN STOCK OR ON SHORT DELIVERY

**H.M.V.** Horizontal Borer Type AV75, 3in. travel spindle.
**PACERA** 1¼in., ¾in. and ⅝in. Drills.
**MILFORD** 10in. × 12in. Double Ended Grinder.
**CARDIFF** 8in. × 40in. S.S. & S.C. Lathe.
**VICTORIA** U2 Rapidmil.
**NORTON** No. 3 Fly Press.
**Q & S** 6in. Saw.

### MACHINE TOOLS AVAILABLE FOR SALE BUT NOT IN STOCK

**PEGARD** Kneeless Type Vertical Miller, 36in. under spindle, table travel approx. 4ft.
**BUFFALO** 28U Double Ended Punch, Shear and Angle Cropper.
**ASQUITH** 6ft. Radial Drill with screw-cutting attachment.
**ORCUTT** 24in. Automatic Gear Grinder. New 1957.
**WARD** 8 Covered Bed Turret Lathe.

MACHINES MOTORISED 400/3/50 UNLESS OTHERWISE STATED

The above list is only a selection of the many New, Used and Rebuilt tools available. please call or write for our priced brochure.

---

**D. S. & G. 24in. Swing Surfacing** and Boring Lathe. 400/3/50.—A. McNAMARA & CO., LTD., New Line, Bacup, Lancs. 'Phone: Bacup 946.

---

**Nearly New Red Ring Gear** Shaving Machine (by National Broach & Machine Co., Michigan), serial GCI1081. Capacity 8in. for 10in. external diameter, with arrangement for elliptoid shaving, cutter head, 25 cutters 5in.—BOX C923, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Bryant No. 4 Internal Chucking** Grinder. Capacity ¼in.-2in. bore. Max. swing 6¼in. dia. Motorised.—WILCOX & CO., Barr Street, Birmingham 19. NORthern 1234/5.

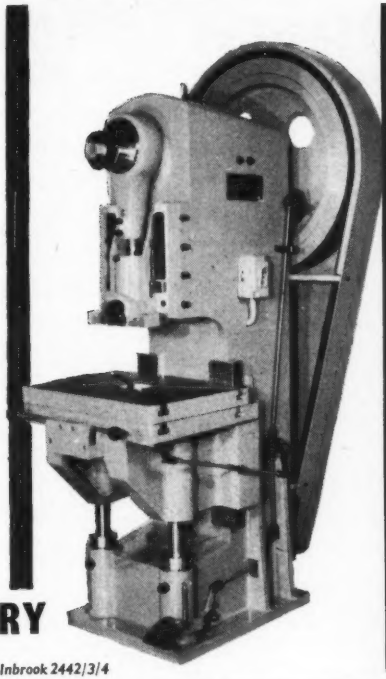
Classified Advertisements (*PLANT FOR SALE, contd.*)

**HEILBRONN**
FOUNDED 1857

This machine incorporates many new features including:

- Unbreakable all steel frame.
- The heavy box construction results in longer tool life.
- Ram guide ways are machine ground and finally scraped.
- The large crankshaft is of heat treated precision forged high tensile steel to withstand the severest conditions.
- All machines have adjustable stroke.
- Standard machines have a rolling key type clutch fitted. If required an electro pneumatic friction clutch is available.

**EARLY DELIVERY ON 20, 30, 45 AND 75 TON MODELS**



**STEEL FRAME PRESSES**

**SMM**

**SHEET METAL MACHINERY COMPANY LIMITED**

POYLE ROAD · COLNBROOK · SLOUGH · BUCKS · *Telephone: Colnbrook 2442/3/4*

---

**Richards No. 2 PRT Horizontal** Boring and Facing Machine complete Live Spindle.

Further details from:—
C. & G. OLDFIELD LTD.,
15, Abercorn Street,
PAISLEY.

---

**Rapiradia All Annealing Oven.** Temp. 400 deg. C. Gas-fired. Conveyor speed 25 i.p.m. Capacity 500 per hour. All tubes 1¼in. dia. × 6in. long.—BOX C706, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**No. 2 Wickman Horstman** Thread Grinding Machine. Form relieving. Fully motorised.—BOX C738, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Acme Gridley Model G, ⅞in.** Four Spindle Bar Automatic, 400/3/50.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

---

**Automatics. Wickman 10 mm.** with four tool slides, high speed screwing attach., gears, bar stands, etc. Good condition. Seen London area.—Telephone: Prospect 8237 or write BOX C980, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**One Secondhand Scrivener No. 1** Centreless Grinding Machine, maximum capacity 1⅛in. diameter with Plunge Feed. Hand Operated. Motorised 400-440/3/50.

C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

---

**SOAG**

OFFER FROM STOCK

**PRODUCTION SLOTTERS**

**14in. BUTLER** High Production.
**16in. CONSOLIDATED BETTS-BRIDGEFORD** Heavy Duty.
**20in. MINGANTI** 1952 Tilting Ram type SM 500.
**36in. ROCKFORD** Hydraulic.

All motorised 400 volts, 3-phase, 50 cycles, power and hand feeds to tables in all directions.

Full details from: **SOAG MACHINE TOOLS, LTD.,**
**7, Juxon Street, Lambeth, London, S.E.11.**
'Phone Reliance 7201. Grams: Sotoolsag, London, S.E.11

---

**36in. Lang All-geared S.S. &** S.C. Chucking Lathe with taper turning attachment. 30in. four-jaw chuck. 36in. between chuck and saddle. 20 h.p., 400/3/50 motor. 12 speeds 8.5-403 r.p.m. Spindle bored 2¾in. dia. Timken roller bearings.—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone: 84246.

---

**Semi-Automatic Thread Milling** Machine by Hanson Whitney. Capacity 4in. dia. × 9in. long. Collet capacity 2in. External cap. 4in. dia. max. with 2in. cutter. Internal cap. ⅜in. dia. min. with ¼in. cutter. Some equipment available.—BOX C931, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Keyseater by Carter & Wright.** Dual feed model. Table 32in. × 12in. 26in. longitudinal movement of spindle. 1½ h.p. spindle head traverse motor. 1½ h.p. spindle motor, 400/3/50.—BOX C968, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**28in. Stroke Rockford Hydraulic** Shaper. Universal table 19in. × 15in. 24in. cross slide movement and 15in. vertical movement to table. Seen London area.—BOX C985, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Several 7 kVA Sciaky Spot** Welding machines.—BOX C629, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**New 6ft. 0in. × 3ft. 6in.; 7ft. 0in.** × 4ft. 0in.; and 10ft. 0in. × 3ft. 0in. Marking Off Tables for sale. Accurately machined top face and heavily ribbed. Mounted on cast iron legs. Total height approx. 34in.—Illustrations and full details from F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

---

*When answering advertisements kindly mention MACHINERY.*

Classified Advertisements (*PLANT FOR SALE, contd.*)

# PIDGEN BROS. LIMITED

## HELMET ROW, OLD STREET, LONDON, E.C.1

*Telephone : CLErkenwell 6481*

**ALL MACHINES MOTORISED FOR 3 PHASE SUPPLY UNLESS OTHERWISE STATED**

**AUTOMATICS**
POTTER & JOHNSON 4D.
**BORERS (Horizontal)**
KEARNS No. 2.
**BROACHING**
AMERICAN Model H2, stroke 30in.
**CAPSTANS**
HERBERT 2S.
MURAD ½in.
HERBERT 4B.
**DRILLS**
DENBIGH 24in. B.G.
HERBERT "C" Power Feed.
CORONA No. 21AR, No. 3 M.T.
JONES & SHIPMAN 816, ⅝in. cap.
CORONA 1AX, No. 1 Morse Taper.
CORONA 15HF, ⅝in. cap.
LELAND GIFFORD 2-sp., No. 2 M.T.
HERBERT Type B. Single Spindle, ½in.
CORONA 6MX Cluster Type.
HERBERT Type H, ½in. cap.
CORONA 12AX, ⅝in. cap.
**ENGRAVERS**
LIENHARD 3 Dimensional (New).
LIENHARD No. 1H.
HUFFIELD Router.
T.T. & H. Type C., C.B. and M.A.
T.T. & H. Multi Etcher.
**FILING AND SAWING MACHINES**
JONES No. 13 Bandsaw.
WICKSTEAD No. 1 Hacksaw.
RAPIDOR 6in. Hacksaw.
RAPIDOR Filing.
**FOLDERS**
Sheet Edging, 30in. × 22g.
**GEAR CUTTERS**
BARBER & COLMAN No. 3.
SAFAG Pinion.
MAXICUT 7in. × 2in. × 6 D.P.
PETERMAN No. 1 and 2.
**GRINDERS (Surface)**
CHURCHILL RBY 24in. ring.
CAPCO No. 2, 14in. × 6in.
CHURCHILL OSB 8in. × 30in.
LUMSDEN Vert. 210 XXM.
SNOW Table, 20in.
ABRASIVE No. 34 Vertical Spindle.
ABRASIVE 3B, 24in. × 8in.
ABRASIVE No. 1½in. hand.
**GRINDERS (Internal)**
BRYANT 16/38 and 5.
**GRINDERS (Cylindrical)**
CHURCHILL 6 × 36in. B.Y.
CHURCHILL PBH 12 × 36in. Uni.
NEWALL 6 × 18. Model XL.
PRECIMAX MPB 10 × 48.
**GRINDERS (Miscellaneous)**
JONES & SHIPMAN, 10in. × 27in.
UNIV. T. & C.
J. & S. Drill, ½in. to ¾in.
STEDALL WUNDERLI Carbide.
TAUCO 10in. Abrasive Cut Off.
ROWLAND 12in. × 2in. Single Wheel.
ABWOOD Carbide.
WICKMAN NIVEN Carbide.
WADKIN Saw Sharpener.
TURNER T. & C.
JACKMAN DIE, 18in. Disc.
EXCEL Model OS, T. & C.
TURNER 14/20, 20in. × 3½in. wheels C/E.
MATRIX No. 10, 8in. × 20in. Plain Thread.
NEWALL 420 Univ. Threads for taps.
HUNT No. 0 and 1 Tap Regrinders.
HUNT No. 0 and 2 Drill.
CHURCHILL Valve.
**HONER**
DELAPENA 4 speed.
**KEYSEATERS**
BENTLEY 5in.
ASQUITH H.K.O. Horiz. Duplex.
EDGWICK 4in.
**LATHES**
MITCHELL 8½in. × 60in. S.S. & S.C.
DENHAM 4½in. × 24in. S.S. & S.C.
MITCHELL 8½in. × 5ft. S.S. & S.C.
LE BLOND Production.
RIVET S.S. & S.C. 4in. Model 602.
SOUTHBEND 10in. Toolroom.
WILLSON 7½in. S.S. & S.C.
COLCHESTER TRIUMPH 7in. S.S. & S.C.
SWIFT 12SV5 Facing and Boring, 48in.
MONARCH 10EE × 22in. S.S. & S.C.
SMALLPIECE 9SW Multi-tool.
RIVETT 3½in. Plain. Model 715.
WARD, HAGGAS & SMITH 8½in. × 78in.
RYDERMATIC No. 12 Multi Tool.
BERRY 6½in. S.S. & S.C.
**MARKING MACHINE**
FUNDITOR "Sand Jet."
**MILLERS (Horizontal)**
ADCOCK & SHIPLEY No. 0. Table 12×4¼.
CINCINNATI O8 Production.
CINCINNATI 1/18 Production.
DENBIGH Type C4. Table 46 × 10.
ROSCHER EICHLER. Table 39in. × 12in.
SUNDSTRAND No. 0 Production.
ST. ANDREA Model UFO3. Table 57×14.
KENT OWEN 1/8 Production.
HARDINGE Precision. Table 25 × 6½.
WERNER. Table 14 × 5.
JONES 225 Univ. Table 22 × 6.
ARCHDALE 20in. dial.
RICHMOND O3. Table 40 × 10.
U.S. Multi Mill. Production.
**MILLERS (Vertical)**
C.V.A. 72 Tool and Die.
PALLAS VI. Table 30 × 8½.
REED PRENTICE No. 5, 68in. × 16in. table.
MILNE. Table 30in. × 8in.
WADKIN Type LXIA. Table 36in. × 13in.
**PRESSES Power)**
BLISS No. 16 Bar.
LECRA No. 8. 4 tons.
GERMAN Rotary Punch.
WRIGHT Clicking Press.
SCHULER VZZ. 15 tons d/s gripper feed.
**PROFILING MACHINE**
CURDNUBE 2 Spindle Model KIV.
**RIVETERS**
HIGH SPEED Hammer, 7/16 cap.
TURNER RH18 (⅛in.), RH38 (⅜in.), RH34 (¾in.), RH14 and 14/12 (¼in.), RS6 (⅛in.).
**SCREWING MACHINE**
ATLAS No. 2, 3in.-6in. (Unused).
**SHAPERS**
INVICTA 10in. and 14in.
NEWEY 14in.
**SLOTTERS**
GSP 9½in.
EDGWICK.
**TAPPERS**
ESSEX No. 24, ¼in. cap.
ACE Horiz., ¼in. capacity.
HASKINS Type 3 C.A.M., ¼in. cap.
J. & S. Electrotap, ¼in.
**THREAD MILLERS**
JONES FB1, 4ft. between centres.
WICKMAN MOULTON 1B.

---

**Ward No. 8 Combination Turret** Lathe Chuck Model. New 1941. Excellent condition.

Further details from:—
C. & G. OLDFIELD LTD.,
15, Abercorn Street,
Paisley.

---

**RICHARDS** No. 2 Oversize Universal Boring and Facing Machine (No. 2 H.T. Hydrabore) with screwcutting motion, **440 VOLTS D.C.** built 1955, practically unused; 3in. traversing spindle; 30in. facing capacity; longitudinal table traverse 5ft.; spindle to outer steady 7ft. 9in.; height spindle to table 42in.

**F. J. EDWARDS LTD.,**
**EDWARDS HOUSE,**
**359-361, EUSTON ROAD,**
**LONDON, N.W.1. EUSton 5000,**
or from
LANSDOWNE HOUSE, 41, WATER STREET, BIRMINGHAM 3.
CENtral 7606-8

---

**NEW MACHINE TOOLS FROM STOCK**

**GRANOR OF HALIFAX 28in. stroke Heavy Duty Shaping Machine. 400-440/3/50.**

**EARLY DELIVERY**

**MITCHELL OF KEIGHLEY 8½in. Type DM8 Gap Bed Lathe, by 5ft. 8in. B.C. 400-440/3/50. Instant delivery.**
**MITCHELL OF KEIGHLEY 10½in. Type DM10 Gap Bed Lathe by 5ft 5in. between centres. 400-440/3/50. Instant delivery.**
**MITCHELL OF KEIGHLEY 12½in. Type DM12 Gap Bed Lathe by 6ft. 9in. B.C. 400-440/3/50. April delivery.**
**VICTORIA No. 2 Rapidmil Universal Milling Machine, table size 48in. × 11½in. 400-440/3/50. Instant delivery.**
**VICTORIA No. V2 Vertical Milling Machine. Table size 45in. × 11in. 400-440/3/50. Instant delivery.**

**CENTAUR TOOL WORKS,**
**EYRE STREET, SPRING HILL,**
**BIRMINGHAM, 18**
**Tel.: EDGbaston 1118 & 1119. 'Grams: Capstan, Birmingham**

---

**Gisholt 1L Combination Turret** Lathe, A.G. Head, 3in. hole in spindle. Swing over saddle 16in. Max. turn off saddle 35in. 7.5 h.p. motor. Electrics 400/3/50. With equipment. Excellent condition.—BOX C552, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Cincinnati O-8 Vertical Milling** Machines. Table working surface 20in. × 6in. Automatic cycle. Good condition.—BOX C554, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Kearns Horizontal Boring Ma-**chine. Model "O." Table dimensions 36in. × 36in., longitudinal traverse 40in., transverse motion 15in. Spindle bore No. 5 morse taper. Speeds 72 to 620 r.p.m. Three speed motor. Cheap to clear.—BOX C557, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Autolec Electrode Boiler, Type** 236. 35 kw., 415 volts. Max. pressure 160 lb. per sq. in. Excellent condition. Purchased 1956.—BOX C634, MACHINERY, Clifton House, Euston Road, N.W.1.

Classified Advertisements (*PLANT FOR SALE, contd.*)

# Harry Kirk

can recommend the following modern quality machines from STOCK

**AUTOMATIC**

**RYDER** Verticalauto, capacity 16in. swing × 6in., 6 spindles

**BORING MACHINES**

**RICHARDS** 36in. Vertical Boring Mill complete with side head.

**JONES** 6in. Spindle Horizontal Borer. Table 17ft. 6in. × 8ft. Spindle travel 48in. Rapid traverse 84in. per min. Motorised 400/3/50. Weight 70 tons.

**SCHARMANN** 3in. Sliding Spindle Horizontal Boring Machine, equipped with facing head and screwcutting.

**BULLARD** 36in. Vertical Boring Mill.

**KITCHEN & WADE** Vertical Fine Boring Machine. 14in. stroke. Compound table.

**SCHIESS** Vertical Boring Mill, 39in. dia. of table. Maximum swing 48in. S.C.M.D. 35 h.p., 400/3/50.

**GRINDING MACHINES**

**HEALD** No. 172 Gap Bed Internal Grinding Machine, maximum diameter of component 36in.

**BILLETER** Hydraulic Open-side Slideway Grinding Machine, capacity 47in. × 12in.

**LATHES**

**NOBLE & LUND** Heavy Duty Centre Lathe, 22in. centre height × 29ft. between centres. Max. swing over saddle 33in. dia.

**HARVEY** Heavy Duty Centre Lathe, 42½in. centre height × 52ft. between centres. Max. swing over saddles 65in. dia.

**CRAVEN** S.S. & S.C. Centre Lathe, 13½in. centre height × 65ft. between centres.

**CRAVEN** S.S. & S.C. Centre Lathe, 13½in. centre height × 31ft. 6in. between centres.

**MILLING MACHINE**

**COLLET & ENGLEHARDT** Keller Type Die Sinking Machine. Model FKf80, capacity 60in × 30in.

**PLANING MACHINES**

**CLEVELAND** Openside Planing Machine, capacity 10ft. × 2ft. 6in.

**CINCINNATI** Planing Machine, capacity 8ft. × 2ft. 6in.

**MISCELLANEOUS MACHINES**

**CLIFTON & BAIRD** Horizontal Cold Sawing Machine, 30in. dia. Saw. Maximum capacity 22in. × 7in. R.S.J

**BUTLER** 18in. Stroke Slotting Machine

Hydraulic Vertical Internal Honing Machine (manufactured by **PETER WOLTERS**), Capacity 0.2in. to 2in.

**RAPIDAN** Double Helical Gear Generating Machine, 12in diameter capacity.

*Further details from*

**HARRY KIRK ENGINEERING LTD.,**

**BRANDON ROAD WORKS, BRANDON ROAD, COVENTRY.**

'Phone:

**WALSGRAVE-ON-SOWE 2253 (6 lines).**

---

**Kearns No. 1 Horizontal Boring** and Facing Machine, complete with Rear Stay. A.C. Motor.
Further details from:—
C. & G. OLDFIELD, LTD.,
15 Abercorn Street,
PAISLEY.

---

**24in. Alba 6S Shaping Machine,** with a.c. motor, 400-440/3/50, 6 ram speeds 8-72 s.p.m. Table 23in. × 13in., 27in. long. traverse. Overhauled (ready).—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone: 84246.

---

DIMCO

**DRUMMOND** Model K Chucking Capstan Lathe.
10in. × 24in. **CHURCHILL** Universal Grinder.
No. 3 **GISHOLT** Bar Feed Capstan Lathes.
U.3 **VICTORIA** Universal Milling Machine with Vertical Head. As new.
No. 2 D.F. **SCRIVENER** Centreless Grinding Machine.
36in. × 10in. **FRITZ WERNER** Vertical Milling Machine, swivelling head.
P.24 **SNOW** Surface Grinder.
New—8in. **GEMINIS** Toolroom Lathe, without Copying Attachment.
No. 2 **WARNER & SWASEY** Chucking Capstan.
4ft. **ASQUITH** Universal Drill. Portable.
8½in. **LANG** S.S. & S.C. Lathe, 4ft. between centres.
New 7in. **WOODHOUSE & MITCHELL** Type 70 Junior Lathe.
20in. **ARCHDALE** Plain Milling Machine. Power feeds and rapids.
6in. **HOLBROOK** Toolroom Lathe.
14in. **BUTLER** Slotting Machine. Circular table.
8½in. **FABIUS** Lathe, 5ft. between centres. (New.)
Model HBY **CHURCHILL** Internal Grinder.
No. 3 **KITCHEN & WADE** Vertical Honer.
27in. **WOTAN** Hydraulic Shaper.
16in. **BLANCHARD** Rotary Surface Grinder.
New 35½in. **ZERBST** Lathe, 10ft. 4in. between centres.
New **LAGUN** 49in. × 12in. Universal Miller, with dividing heads and universal attachment. Power feeds and rapids in all directions. £1,250.

**DIMCO (Gt. Britain) LTD.**
**28, Wood Lane,**
**SHEPHERD'S BUSH,**
**LONDON, W.12.**
SHEpherds Bush 4401/2.

---

**Loewe Boring and Facing Lathe,** high speed machine, 475 to 3,000 r.p.m. Swing 16in. Multi-speed motor, 400/3/50.—BOX C606, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Drummond Maxicut No. 2 Multi-tool Lathe,** 30in. between centres. Swing 22in., longitudinal saddle movement, 18in., fitted with extra slides on front and rear toolposts. Auto. return to slides. Motorised 45 h.p. 400-440/3/50.—BOX C664, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Norton Universal Grinding** Machine. 1942. Size 12in. × 36in. Condition good. External/internal equipment.—BOX C679, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Rowland Duplex Face Grinding** machine. Series 6600M, two heads opposed with 24in. dia. wheels. Max. distance between 9in. Each head driven by two 40 h.p. motors. 400/3/50. Hydraulic feed pump and 2 to 3 h.p. motors, 400/3/50. Auto. feed works arm, power oscillation, Hydraulic wheel dresser, control box and Allen West starter, overall size 11ft. × 8ft. × 7ft. high. This machine is ideal for facing two sides of a component with double dimensions such as a con rod, large and small end bearing facing.—BOX C577, MACHINERY, Clifton House, Euston Road, N.W.1.

---

# Cashmores

**Selection of Machine Tools from Stock**

**CENTRE LATHES**

**MITCHELL** 7in. S.S. & S.C. All-Geared Head Gap Bed Lathe, to admit 3ft. 0in. between centres.
**WILLSON** 7½in. S.S. & S.C. Lathe, to admit 3ft. 0in. between centres.
**FAIRBAIRN** 13in. S.S. & S.C. Lathe with two saddles, to admit 17ft. between centres.
**LANG** 8½in. S.S. & S.C. Lathe, to admit 4ft. 0in. between centres.
**VOLMAN** 8in. S.S. & S.C. Gap Bed Lathe, to admit 4ft. 6in. between centres.

**BORING MACHINE**

**WEBSTER & BENNETT** 48in. Vertical Boring Mill, table speeds 4-88 r.p.m.

**DRILLING MACHINE**

**RICHMOND** SR1 36in. Sensitive Radial Drilling Machine.

**GRINDING MACHINES**

**JONES & SHIPMAN** Fig. 540 Horizontal Spindle Surface Grinding Machine, hydraulic feed, 6in. × 18in. capacity.
One similar Machine with vertical spindle.
**NORTON** 6in. × 18in. Horizontal Spindle Surface Grinding Machine with hydraulic feed.
**LUMSDEN** Model 90LE Vertical Spindle Rotary Table Surface Grinding Machine, with 24in. diameter magnetic chuck.
**NORTON** 6in. × 30in. Hydraulic Plain Cylindrical Grinding Machine, maximum wheel diameter 20in.

**MILLING MACHINES**

**VICTORIA** M.2 Universal Milling Machine, 40in. × 10in. table.
**ARCHDALE** 20in. Dial Type Horizontal Milling Machine, 40in. × 12in. table.
**GREENWOOD & BATLEY** Plain Horizontal Milling Machine, working surface of table 20in. by 10in.
**EDGWICK** 18in. Horizontal Plain Production Milling Machine, with 40in. × 12in. table.
**EDGWICK** No. 2 Dial Type Vertical Milling Machine, 46in. × 11in. table.

**PLANING MACHINE**

**SWIFT SUMMERSKILL** 8ft. × 4ft. × 4ft. Planing Machine with 4 toolboxes, all electric Lancashire Drive.

**POWER HAMMER**

**MASSEY** 5 cwt. Pneumatic Side Type Power Hammer.

**SLOTTING MACHINES**

**BUTLER** 14in. stroke All Geared Slotting Machine with 39in. diameter rotary table.
**DUTRANNOIT** 24in. stroke Precision Slotting Machine with swivelling head, 39½in. table.

**SHAPING MACHINES**

**BUTLER** 12in. Heavy Duty Shaping Machine with swivelling table.
**BUTLER** 18in. Heavy Duty Shaping Machine.

**SHEARING MACHINE**

New **KEETONA** 8ft. 0in. × ¼in. Undercrank Guillotine Shearing Machine.

**STRAIGHTENING ROLLS**

**BRONX** 8ft. 0in. × ¼in. Straightening Rolls, 5 roll type.

All the above machines are motorised 400-440/3/50 cycles.

**JOHN CASHMORE LTD.**
**NEWPORT 1, MON.**
Tel.: Newport 66941 (6 lines).

Classified Advertisements (*PLANT FOR SALE, contd.*)

# FRYE

**COVENTRY** Matrix 21 Thread Grinder.
**ASQUITH** 3½in. Floor Borer, spindle speeds 5.6-350. Screw cutting 3-12 t.p.i.
**CHURCHILL** 20in. × 84 Plain Grinder with throw blocks for crankshaft grinding.
**PROGRESS** 4E Pillar Drill.
**CINCINNATI** Model EA, 18in. × 6in. Plain Grinder.
**TRIDENT** 18in. × 6in. Surface Grinder.
**SCHUTTE** Model WU4 20 × 6 capacity, hydraulic automatic feed to table.
**JONES & SHIPMAN** 4in. × 10in. Semi Universal Grinder.
**RICHMOND** MV1 Vertical Miller.
**ADCOCK & SHIPLEY** 2V Vertical Miller.
**PEARN RICHARDS** Horizontal Borer, 28in. dia. facing head rapid traverses and screw cutting.
**SMART & BROWN** 4in. Capstan.
150 ton 10ft. Press Brake, with Fraser Mono Radial. 30 h.p. pumping unit.
Two **TAVANNES** Single Spindle Automatics, Type M60. Bar capacity 2⅛in. Max. turning length 8¼in. About 4 years old. Half new price.
**KOLB** KZ1 Spur and Helical Gear Grinder. Up to 12in. dia. As new.
**ABRASIVE** No. 3 Horizontal Spindle Surface Grinder, 24in. × 8in. capacity.
**GISHOLT** 3L Combination Turret Lathe, 4¼in. hollow spindle. 10 h.p. motor.
**WICKMAN MOULTON** ATM1 Thread Miller. Max. dia. milled 6in. external, 7¼in. internal. Distance work and cutter spindle 24in.
**HULLER** UG3 Radial Arm Tapper.
**CHURCHILL** 20in. Swing × 84in. Cylindrical Grinder.
7in. Power Hacksaw.

**FRYE MACHINE TOOL CO. LTD.,**
**POYLE ROAD, COLNBROOK, BUCKS.**
Telephone: Colnbrook 2442.

---

**Multi-Spindle Bar Automatic,** New Britain Gridley, 6-spindle, 1in. capacity, with some equipment. Also ¾in. capacity B.S.A. Acme Gridley 6-spindle Bar Automatic machine. Full equipment. Excellent condition.—London area. For details and photos apply.—BOX C868, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Brown & Sharpe OOG Single-** spindle Automatic for sale, series 14,400. Also C.V.A. No. 8 ditto. Electrics 400/3/50.—BOX C876, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**Lang Boring Lathe, All Geared** head. 12 speeds 19-900 r.p.m. Standard machine with plain top saddle, area 20in. × 19in. 7½in. to spindle centre line. 54in. auto traverse. Feeds 36 to 432 c.p.i. 1⅛in. dia. hole in spindle. Very good condition.—BOX C913, MACHINERY, Clifton House, Euston Road, N.W.1.

---

**1½G Reed Prentice Diecasting** Machine. Platens 29in. × 29in. incl. columns. Max. daylight 28in., min. 16in. Built-in time control. 400-440/3/50 electrics. Excellent condition.—BOX C946, MACHINERY, Clifton House, Euston Road, N.W.1.

---

# SALES ENTERPRISE LTD.
## FOR
# NEW MACHINE TOOLS

### LATHES

**COLCHESTER** 5in. Chipmaster. (Aug.)
**COLCHESTER** 7½in. Triumph. (June.)
**BROADBENT** 8½in. (June.)
**BROADBENT** 10in. (June.)
**CARDIFF** 7½in. (June.)
**WILLSON** 7½in. Mark V. (June.)
**WOODHOUSE & MITCHELL** 7in. (June.)
**SV18R** 7in. Toolroom. (May.)
**BINNS & BERRY** 12½in. (Aug.)

### MILLING MACHINES

**VICTORIA** O2 Omnimil. (Stock.)
**VICTORIA** Junior Mill. (Stock.)
**VICTORIA** V2 Vertical. (Aug.)
**VICTORIA** V3 Vertical. (May.)
**VICTORIA** V4 Vertical. (May.)
**VICTORIA** V2 Rapidmil Vert. (May.)
**W. & M.** 369 Turret Mill. (Stock.)
**VICTORIA** U3 Universal. (July.)
**VICTORIA** U2 Rapidmil. (Aug.)
**BEAVER** Turret Mill. (June.)
**MAS** FU2A Universal. (June.)
**INDUMA** 3U Universal. (May.)
**GIEWONT** No. 4 Vertical. (May.)
**GIEWONT** No. 2 Vertical. (May.)

### GRINDERS

**EXCEL** No. 5 Tool and Cutter Grinder. (Stock.)
**EXCEL** No. 1 Surface Grinder. (Stock.)
**BURDETT** 18in. × 6in. Surface Grinder. (June.)
**BURDETT** 24in. × 8in. Surface Grinder. (June.)
**ELB** 24in. × 12in. Surface Grinder. (June.)
**ELB** 40in. × 12in. Surface Grinder. (May.)
**RIBON** RUR500 Universal Grinder. (Stock.)

### SHAPERS

**INVICTA** 30in. Major, swivel table, auto down feed. (Stock.)
**INVICTA** 6M, 24in. (Stock.)
**ALBA** 4S, 18in., swivel table. (Stock.)

### DRILLS

**RICHMOND** 8R2 36in. Radial. (Stock.)
**RICHMOND** HB3/12,48in. Radial. (June.)
**PROGRESS** 3E, 1¼in. cap. Pillar. (May.)
**PROGRESS** No. 1 and 18, ¾in. cap. (Stock.)
**PROGRESS** No. 2G and 2GS, ⅝in. cap. (Stock.)

### EQUIPMENT

**VICTORIA AND EXCEL** Rotary Milling Tables, all sizes. (Stock.)
**VICTORIA** Dividing Heads, all types. (Stock.)

**274, MANCHESTER ROAD,**
**AUDENSHAW,**
**MANCHESTER.**

Tel. No.: DROylsden 1335/6.

---

**15in. Centre "Dean, Smith &** Grace" Type 4/9D m/d. all-gd. S.S. & S.C. Lathe with taper turning attachment. 11ft. box end gap bed. 5ft. 6in. b.c. 48in. dia. in gap. 5 h.p. 415/3/50 motor. 16 spindle speeds 9-180 r.p.m. Spindle bored 3⅛in. dia.—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone 84246.

---

**Landis 10in. × 24in. Type "C"** Universal Grinder. Internal Attachment. New condition.

Further details from—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

---

# F. J. Edwards Ltd

### GRINDING MACHINES

**SUPERIOR** Horizontal Surface Grinder, 15in. × 5in., hand feed. (New.)
**BROWN & SHARPE** 18in. × 6in. Horizontal Surface Grinding Machine.
**COVEL** 24in × 8in. Hydraulic Horizontal Surface Grinder.
**JUNG** 18in. × 6in. Hydraulic Horizontal Surface Grinder.
**WRIGHT** 12in. Table Surface Grinder. (New.)
**GRAND RAPIDS** No. 25 Hydraulic Spindle Surface Grinders, 18in. × 6in. table, 20in. table traverse.
**NORTON** 6in. × 10in. × 36in. Hydraulic Open-side Surface Grinder.
**HEALD** No. 72 Size-Matic Duplex Hydraulic Internal Grinder, for finish grinding opposite holes.
**SMART & BROWN** 1½in. cap. Internal Grinder.
**BRYANT** 16-38A Hydraulic Internal Grinder.
**CINCINNATI** 6in. × 18in. Model EA Hydraulic Cylindrical Grinder.
**CHURCHILL** Model HBB automatic sizing traverse feed type Internal Grinding Machine, with spindles for combined hole and face grinding, max. swing 19in.
**PRATT & WHITNEY** 36in. × 12in. Vertical Spindle Surface Grinder.
**HUNT** No. 3 Twist Drill Grinder, 3in. cap.
**HUNT** No. 1 Twist Drill Grinder, ½in. cap.
**BANDFACERS** 43in. × 6in., and 36in. × 4in. (New.)

### MILLING MACHINES

**CINCINNATI** 0-8 Vertical Miller, 20in. × 6in., 150-1,300 r.p.m.
**ADCOCK & SHIPLEY** No. 2VP Vertical Production Milling Machine, table 30in. × 10in. capacity 22in. × 8in. × 18in., speed 750-1,500 r.p.m.
**ARCHDALE** 12in. light type high speed Vertical Milling Machine, table 17in. × 10in., 12in. traverse, speed 235-1,500 r.p.m.
**B.C.A.** Precision Vertical Milling, boring and Drilling Machine, 8in. dia. table.
**HERBERT** 46V Vertical Milling Machine, capacity 36in. × 13½in. × 22½in., table 58in. × 15in.; power rapid all ways.
**REED PRENTICE** No. 5 Vertical Milling Machine, kneeless type, capacity 48in. × 16in. × 15in., table 68in. × 16in., speed 17-600 r.p.m.
**REED PRENTICE** No. 5 Vertical Milling and Diesinking Machine as above, with power feed to spindle.
**VAN NORMAN** No. 38U Universal Miller; 64in. × 14in., capacity 34in. × 12in. × 17½in., 25-1,250 r.p.m.; 1955 machine.
**VICTORIA** U1 Universal Miller, table 40in. × 11in., capacity 25in. × 8in. × 16in., speeds 31-1,010 r.p.m.
**VICTORIA** U1 Universal Miller, table 40in. × 11in., capacity 25in. × 8in. × 16in., speeds 31-1,010; with vertical milling attachment.
**VICTORIA** U2 Universal Milling Machine, table 45in. × 11in., with vertical milling attachment, slotting attachment and rotary table.
**MILWAUKEE** 2K Universal Miller, table 56in. × 12in., capacity 28in. × 10in. × 17in.; 1,500 r.p.m.
**CINCINNATI** No. 2 Dial Type Universal Miller, table 49in. × 10in., capacity 28in. × 10in. × 16in.
**BROWN & SHARPE** 2A Universal Miller, table 45in. × 10in., capacity 28in. × 10in. × 18in.
**PROGRESS** Universal Milling Machine, table 40in. × 10in., capacity 24in. × 9in. × 18in.
**PEDERSEN** Horizontal Miller, table 49in. × 10in. Capacity 24in. × 7½in. × 16in.
**EDGWICK** No. 1 SIMPLIMILL Horizontal Production Milling Machine, table 18in. × 5in., capacity 10in. × 3½in. × 13in., speeds 60-540 r.p.m.
**ADCOCK & SHIPLEY** 1AD Horizontal Milling Machine; table 19in. × 7in.; capacity 10in. × 6in. × 10in.; speeds 50-2,500 r.p.m.
**DENBIGH** Model C2 Horizontal Milling Machine, swivel table 34in. × 10in.; capacity 24½in. × 7½in. × 16in.
**HERBERT** No. 1 Horizontal Milling Machine; table 26in. × 8¼in.; capacity 10in. × 3½in. × 7in.; speed 100-530 r.p.m.

**359-361, EUSTON RD., LONDON, N.W.1**
*Telephone: EUSTON 5000. Telex No. 24264.*

**And at Lansdowne House, 41, Water St., Birmingham, 3.** *Telephone: Central 7606-8*

# carefully used modern design

# TATE

## STIRK OPEN SIDED PLANING MACHINE

Good Used STIRK "HILOPLANE" Open Sided Planing Machine, with capacity of 16ft. planing length. 9ft. 1in. planing width, and 6ft. 7in. under the cross-rail. The machine has a heavy duty supplementary side support for the cross-rail, which can be moved, making the machine fully open sided for extra wide work. The machine is also suitable for cross-planing. General specification is as follows:—

Overall size of table 17ft. by 7ft. Maximum width plane 9ft. 1in. Maximum height admitted between toolbox and table ... ... ... 6ft. 7in.

The bed and table are designed for extension to extended length by addition of new sections.

Two toolboxes on cross-rail with automatic feeds and automatic lift. These toolboxes may be used for cross-planing.

One toolbox on main upright with automatic feed and automatic lift.

One toolbox on auxiliary upright with hand adjustment. The upright is removable for wide work.

The machine is fitted with STIRK Patent Split Field Drive. The Generator Set operates on an input of 400/440 volts, 3 phase, 50 cycles A.C. supply. This Generator set then drives the following D.C. drive motors:—

| | |
|---|---|
| Main table drive ... ... ... ... ... | 50 H.P. |
| Cross feed motor ... ... ... ... | 5 H.P. |
| Elevating motor ... ... ... ... ... | 10 H.P. |

Operation of the machine is by suspended PENDANT CONTROL so that the operator has full electrical control at all times. Floor space required for the machine when fully assembled is 30ft. by 21ft. at widest point.

DELIVERY: Immediately from stock, subject to prior sale.

***348-354 KENSINGTON HIGH STREET***
***LONDON W.14***

***Telephone WEStern 7031 (5 lines)***
***Telegrams TateTools LONDON***

Classified Advertisements (*PLANT FOR SALE, contd.*)

**RING BELLS** *for machine tools*
LEEDS 63-7398

**Cleveland Gear Hobbing Ma**chine, model 130. Max. dia. 8in. × 16in. between centres. Travel 8in. Machine constant 12. Max. hob dia. DP.4 in steel. Electrics 400/3/50. Drive 3 h.p. motor. Rapid traverse motor 1½ h.p.—ROLLS TOOLS, LTD., Pyrford Road, Pyrford, Woking, Surrey, or 'phone Byfleet 43252.

**Cincinnati No. 2 Plain Hori**zontal Milling Machine, Dial type. Med. speed. Dual controls. 3-way Rapid Power Traverse.—BOX C702, MACHINERY, Clifton House, Euston Road, N.W.1.

**YOUR ADVERTISEMENT RECEIVED ON WEDNESDAY WILL APPEAR NEXT WEDNESDAY**

**New Rhodes 10ft. × ¼in. Fluid** Driven Shear, complete with Motor, Starter, Shadow Line Lighting, Pressure Gauge, Surge Tank with Reducing and Relief Valve and Stop Cock. Remote Cable Control. Delivery ex-stock.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

**Butler 8in. Slotter, Capacity 8in.** stroke, 20in. dia. table, electrics 400/3/50. Excellent condition.—BOX C846, MACHINERY, Clifton House, Euston Road, N.W.1.

**6in. RPA 8 Spindle Gridley** Chucking Auto complete with Chucks, Cams, Tool Slide Holders, etc. Fully motorised. Excellent condition.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

**Wilkins Multi-spindle Drilling** Machine, 12 spindles: 9 No. 3 M.T. and 3 No. 4 M.T.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

**Landis Type C 6in. × 18in.** Plain Cylindrical Grinder, serial 27021 self-contained 400/3/50, hydraulic traverse, good condition. £300.—E. SMITH (MACHINE TOOLS), LTD., 76 St. Lukes Road, Birmingham 5.

**Petermann No. 1 Automatic** Inclined Bed for sale; £295.—BOX C918, MACHINERY, Clifton House, Euston Road, N.W.1.

**Milwaukee No. 3 Plain Miller** with Vertical Head.—BOX C919, MACHINERY, Clifton House, Euston Road, N.W.1.

**Rhodes Grooving Press For Sale.** For clenching the side seams on kegs, drums and other bodies. Max. length of drum handle 30½in. Max. thickness of material 20 s.w.g. Dia. of mandrel 4⅜in. Arranged motor drive 400/3/50.—F. J. EDWARDS LIMITED, 359, Euston Road, N.W.1, or 41, Water Street, Birmingham 3.

**Parkson Gearbur Machine for** Spur and Helical Gears up to 11in. dia. × 11in. long. Unused.—Offers to: JOHN BAMBER ENG., LTD., Walmgate Road, Perivale. Perivale 8476.

**For Sale: Gas-fired Furnace and** Austempering Bath. Pyrometer controlled.—MOBBS & LEWIS, LTD., Carrington Works, Kettering. Telephone: Kettering 2207.

**Archdale Snout Borer, Modern** machine. Spindle dia. 5in. Table area 65in. × 19in. 7.5 h.p. Spindle nose 50 Int. taper. Rapid power approx. to work. Auto change-over to feed and run. Fast return electrically controlled.—BOX C770, MACHINERY, Clifton House, Euston Road, N.W.1.

## CRANES FOR SALE

**OVERHEAD ELECTRIC 3-TON TRAVELLING CRANES FOR SALE**

Bristol Street Motors Ltd, Main Ford Distributor, having purchased a factory which includes 3 O.E.T. Cranes (Two Herbert Morris Cab Controlled and one Ardicar press button operated, complete with track) wish to dispose of them at prices which are considerably less than valuation. Bargain for anyone requiring Cranes to these specifications.

For full details apply:

**The Secretary,**
**BRISTOL STREET MOTORS LTD**
**160-182 Bristol Street,**
**Birmingham, 5**

## MISCELLANEOUS FOR SALE

**Induction Heaters, for Brazing,** heat treatment, etc., 1 kW rating. £150.—NU-GUN TELETUBES, LTD., 3, The Mews, Ducket Road, London, N.4. MOU. 2903.

# SITUATIONS VACANT

*If you do not wish your reply to any Box No. advertisement in this section to be forwarded to certain firms, please advise us. Your reply will then be destroyed, but you will not be notified as this would disclose the identity of the advertiser.*

**Young Draughtsman, Age 25-30,** with experience of machine tools required by London company. This position offers opportunity to an ambitious and energetic engineer, preferably with some commercial experience to organise and to take charge of an interesting new division for an established company. Applicant must hold driving licence and be prepared to travel widely and be willing to work hard on own initiative to make most of excellent existing prospects. Apply in confidence, stating box number on reply, giving age, experience, previous positions held in chronological order, salary required.—BOX C849, MACHINERY, Clifton House, Euston Road N.W.1.

**MINISTRY OF LABOUR Re**quire Engineer for appointment as General Instructor (Education Officer) (Unestablished) at Government Training Centre, Letchworth, Herts. Applicants must have served recognised apprenticeship in Engineering plus at least 5 years recent first class exp. in trade. They should have an interest in educational subjects and able to teach elementary mathematics covering simple problems involving vulgar and decimal fractions, algebra and calculations from formulae. Should preferably possess O.N.C. or C. & G. Cert. or equiv. quals. where appropriate. Selected applicants will be required to pass Theoretical Test before appointment and practical test of normal trade skills after taking up appointment. Prospect of eventual estab. Commencing salary (at age 30 and over) £966 p.a. rising by two annual increments to £1041 p.a.—Write for appn. form within 7 days to Employment Exchange, Letchworth, Herts.

WIGAN AND DISTRICT MINING AND TECHNICAL COLLEGE

**Applications are Invited for a** post of Senior Lecturer in Mechanical Engineering commencing 1st September, 1961, or by arrangement.

Candidates should preferably be honours graduates with industrial and/or teaching experience and possess corporate membership of the Institution of Mechanical Engineers.

Salary in accordance with the Burnham Technical Scale for Senior Lecturers: viz. £1,550 by £50 to £1,750 per annum. Full allowance up to the maximum of the scale is given for appropriate experience.

Further particulars and application form will be sent by the undersigned. Last date for the receipt of applications: Friday, 19th May, 1961.

E. C. SMITH,
Principal.

Classified Advertisements (*SITUATIONS VACANT, contd.*)

## MACHINE TOOL SALESMAN

Established Merchants require experienced man 30-40 years, to operate in Midland area.

Applicants must have Engineering background with proved ability to sell machines and equipment. Good prospects, car provided.

Applications in confidence:—

**BOX C.903, MACHINERY, Clifton House, Euston Road, N.W.1.**

## SENIOR SALES ENGINEER

required to represent in

**NORTH OF ENGLAND**

**MANUFACTURER & IMPORTER OF HIGH CLASS MACHINE TOOLS**

Applicants should be between 30 and 40 years and have had good experience in sales of machine tools.

**Write, in confidence, giving fullest information to Box C873, MACHINERY, Clifton House Euston Rd., N.W.1**

## TECHNICAL SALES ENGINEER

wanted to handle imports and sales of Hydraulic Cutting Presses and other plastics machines.

Good prospects for successful applicant who must have experience. Knowledge of German helpful.
Write full career details to:—

**The Managing Director**
**F. J. EDWARDS LIMITED**
**359-361 Euston Road, London, N.W.1**

**MOULD MAKER** for Injection and Compression Moulding Tools.

**TOOL TURNER.**

**GOOD SETTER** for small Press Work. Must be able to act with minimum supervision on fast moving batch production.

**YOUNG MAN** wanted for SHORT RUN TURNING JOB and pre-production work. Experience in a mould shop an advantage.

*Apply:*

**Personnel Manager**

**ESSEX MICA CO LTD**

**Fowler Road, Hainault.**
Or ring: Hainault 4166.

**W. H. ALLEN SONS & CO. LTD.**
**ATLAS WORKS, PERSHORE**

require a

## PLANNING ENGINEER

for process planning of machining operations for the manufacture of medium/heavy gearing, pumps and steam turbines of an interesting variety in small batches. Applicants must be apprenticed-trained engineers between 26-35 years of age, preferably with planning experience, although consideration will be given to machinists with all-round experience in modern workshop techniques, and who have gained an O.N.C. The Company operate a contributory Life Assurance and Pension Scheme and is prepared to give financial assistance towards moving expenses. Please write, in confidence, giving full details of education, training and experience to the

**PERSONNEL MANAGER, ATLAS WORKS PERSHORE WORCESTERSHIRE**

**Workshop Superintendent Required** by well known Electronics Company in North Hampshire, to take charge of machine, sheet metal and finishing shops producing a wide range of components to a very high standard in small batches. The successful applicant will have experience of, and an interest in, running these shops under modern production control conditions, and understand that programmes are meant to be met. The factory is modern and situated in pleasant country surroundings. The position is permanent and carries a good salary. Eligible to join Company's Pension Scheme after qualifying period. Please state fullest details of experience, qualifications and salary required.—BOX C904, MACHINERY, Clifton House, Euston Road, N.W.1.

## DRAUGHTSMEN REQUIRED

for interesting work on the design and development of a wide variety of electronic projects including Military and Civil Airborne Radar Systems, Static Transistor Inverters, and Machine Tool Controls. Applicants, suitably qualified, will be considered for the post of Section Leader. Apply in writing giving full details of qualifications and past experience to:

The Personnel Manager,

**EKCO ELECTRONICS LIMITED**
**Ekco Works, Southend-on-Sea, Essex**

*quoting reference EE/DOI.*

**Toolroom Foreman Required for** expanding toolroom in North West Hampshire. The successful applicant will be responsible for some 35 operators. Experience should include jigs, fixtures, gauges, press tools and plastic moulds. Prospects are bright for a live practical man, able to control labour. Housing available now.—BOX C915, MACHINERY, Clifton House, Euston Road, N.W.1.

**Technical Correspondent Required** to deal with correspondence, price lists, quotations, etc., in connection with sales of high-class Continental Machine Tools. Machine tool and some commercial experience is essential and knowledge of French would be an advantage. The position offered is permanent and progressive to a young engineer with suitable qualifications, energy and initiative. Apply in confidence, stating box number on reply, giving age, experience, previous positions held in chronological order, salary required.—BOX C829, MACHINERY, Clifton House, Euston Road, N.W.1.

**Two Tutors for Workshop** subjects in City and Guilds and National Certificate courses. Good workshop experience, suitable qualifications and some teaching experience are desirable. Salary scale (about to be revised upward) £738 to £1,201 with placing on the scale according to experience.—Applications by letter (no forms) with two testimonials and two referees to the PRINCIPAL, SOUTH HERTS COLLEGE OF FURTHER EDUCATION, Wood Street, Barnet, as soon as possible.

**General Manager Wanted for** light Engineering works, North London, to control office and production on Automatics and Capstans. Must have held similar position. Apply in strict confidence giving age, qualifications, experience, and salary required.—BOX C864, MACHINERY, Clifton House, Euston Road, N.W.1.

Classified Advertisements (*SITUATIONS VACANT, contd.*)

**Sales Engineers, Age 30-40,** required for London offices of established Importers of high-class Continental Machine Tools. Extensive machine tool technical and sales experience with exceptional energy and initiative are essential, knowledge of French would be an advantage. The positions offered are permanent and have excellent promotion prospects. They entail considerable travel in U.K. (driving licence essential) and abroad, remuneration is commensurate with experience and results achieved. Apply in confidence stating box number on reply, giving age, experience, previous positions held in chronological order, salary required.—BOX C841, MACHINERY, Clifton House, Euston Road, N.W.1.

**Service Engineer with Considerable** experience in installation of high-class Machine Tools immediately required by London company. Following tuition by manufacturers abroad work will entail extensive travelling in U.K. Apply in confidence, stating box number on reply, giving age, whether driving licence is held, experience, previous positions held in chronological order, salary required.—BOX C834, MACHINERY, Clifton House, Euston Road, N.W.1.

**Highly Paid, Secure and Interesting** posts are always available for technically trained men. Find out how you can put some letters after your name by preparing at home on "No Pass—No Fee" terms. A.M.I.Mech.E., A.M.I.Prod.E., A.M.S.E., City and Guilds, etc. Full details of exams. and hundreds of courses in all branches of Engineering. Draughtsmanship, Management and Automation Techniques, the benefits of our Employment Dept., and unique record of 95 per cent. successes are given in "Engineering Opportunities"—a valuable 148-page Guide which will reveal many chances you are now missing.—Write for your copy today (stating subject of interest).—FREE and without obligation, B.I.E.T. (Dept. 43a), 29, Wright's Lane, London, W.8.

**Toolmakers Required. Must be** first-class men with experience on Press Tools. Top rates for highly skilled men.—Apply BRIGHTON SHEET METAL WORKS, LTD., Lower Bevendean, Brighton.

**Technical Cost Investigator** required for various interesting production engineering, electronic and reinforced plastic projects. Knowledge of Ministry contracts procedure an advantage. Would suit senior estimator used to working on own initiative. Good salary, pension scheme.—Write stating age, experience, etc., to PERSONNEL MANAGER, MICROCELL, LTD., 9, Kingsway, W.C.2.

**A Working Foreman is Required** for a new Shop in Brentford, Middlesex. The man we are looking for is one who can himself work on Lathes, Millers and Grinding Machines, to toolroom standards and he should also have enough about him to be able to build up a Shop from an empty floor. Interviews can be arranged outside working hours.—Full details, please, to BOX C927, MACHINERY, Clifton House, Euston Road, N.W.1.

## REPRESENTATIVES

**Can You Sell Small Tools? The** LONDON TOOL (SMALL TOOLS) CO., LTD., need (a) experienced representative; (b) young beginner.—Write stating age and experience to SALES DIRECTOR, at Fulwood House, Fulwood Place, W.C.1.

**SALES ENGINEER wanted** to sell locally near new, 200 to 2000 ton capacity U.S. stamping and forging presses.
*Furnish detailed experience record. Will interview locally in May.*
**Wender Presses Inc., 1957D, Clay Ave., Detroit 11, Mich. U.S.A.**
*Cable address: Wenderpres.*

**Progressive London Company** wish to appoint experienced Agent in West County. Experience in the tungsten carbide and allied fields. Area offered: Gloucestershire, Somersetshire, Wiltshire and South Wales. Principals only.—BOX C914, MACHINERY, Clifton House, Euston Road, N.W.1.

# SITUATIONS WANTED

**Manager With Extensive Experience** light precision engineering, administration, toolroom, production, prototype and development departments, etc., desires change small/medium company, accustomed full control and modern management techniques, prepared to move.—BOX C908, MACHINERY, Clifton House, Euston Road, N.W.1.

**Buyer. Age 27. Adaptable.** Thorough general trade and commercial knowledge. Many varied market contacts. Now with merchant. Seeks permanent post with expanding manufacturer. Salary commence about £1,000 p.a. Confidence respected.—BOX C911, MACHINERY, Clifton House, Euston Road, N.W.1.

**Works Manager, 41, Extensive** experience sub-contract work, repetition, batch, machine tools included. Accustomed full command all departments ancillary to planned production and results. Seeks change, firm having own products preferred.—BOX C893, MACHINERY, Clifton House, Euston Road, N.W.1.

**Machine Shop Engineer, Age** 47 years requires position. Practical experience includes Tool room, Machine shops, ancillary departments: such as Planning—Methods—Design—Estimating. Shop loading.—BOX C896, MACHINERY, Clifton House, Euston Road, N.W.1.

**Production Engineer, 39 Years** old. O.N.C. Experience: Planning, Estimating, Jig and Tool, Batch and Flow production. General and special purpose machines, project planning, selection and purchase machine tools, supervisory. Present Company Pneumatics and Hydraulics. Seeks position with scope. Salary around £1,500.—BOX C917, MACHINERY, Clifton House, Euston Road, N.W.1.

**RECEIVED TOO LATE FOR CLASSIFICATION**

**CONTRACT WORK**

**•• MACHINING ••**

**Precision Machined Parts . . .**
D.G.I. Approved. Milling, Grinding, Turning, Capstan, Thread Milling, Centreless Grinding also Profile Tool Grinding. Jig Boring, Toolmaking.
*Send your specifications to:—*
**ALEXANDER BROS., Dolphin Works, Godalming, Surrey.**
Tel. Godalming 731.

**GENERAL ENG'G. •• SERVICES ••**

**R. WEBB**
**PRECISION & GENERAL ENGINEERS**
Prototype & development work undertaken, and machining for all industries.
**24 Amwell St., Hoddesdon, Herts. Hoddesdon 4432**

**CASTINGS**
Repetition Grey Iron and Heat Resisting. Alloy Chrome/Iron/Steel Castings. Heat Resisting Iron Crucibles all sizes and capacities. Metal Melting Furnaces all metals.
**LEES HALL & SONS LTD., Newhaven Sx.**
Tel. Newhaven 414

## PLANT WANTED

**Wanted. 1¾in. 5-spindle Wickman** Bar Machine.—BOX C674, MACHINERY, Clifton House, Euston Road, N.W.1.

**Wanted. Mandrel Support** Steady for Archdale 28in. × 30in. Horizontal Mill (Vee Shaped will do).—BOX C760, MACHINERY, Clifton House, Euston Road, N.W.1.

**Wanted, One Dead Length Collet** Chuck to suit a 2D Herbert Capstan.—BOX C869, MACHINERY, Clifton House, Euston Road, N.W.1.

**Electro Polishing Plant Required,** suitable aluminium and stainless steel. Give price, description, tank sizes, type liquid used, electric rating, control gear, etc.—BOX C922, MACHINERY, Clifton House, Euston Road, N.W.1.

compac

NEW DIAL GAUGE

TYPE 523A

To Swiss Standard Specification No. VSM. 58060

RANGE ·400 in.

CALIBRATED ·0005 in.

*Patent Shock Proof System*
*Revolution Counter,*
*Rotating Bezel and Adjustable Tolerance Indicators*

PRICE £5·10·6

- ROBUST
- SENSITIVE
- ACCURATE

★ *Send for Leaflets to the Sole Importers.*

**H · WILLIAMS & SON LTD**

**LARK WORKS · PHONE 52264/5/6 · ST. ALBANS**

*Sole importers of Öberg Burs in Tungsten Carbide, high speed and tool steel.*
*Main distributors for Öberg Engineers' Files.*


# INDEX TO ADVERTISERS


| | PAGE |
|---|---|
| Abbey Heat Treatments Ltd. | 151 |
| A.B.M.T.M. Ltd. | 52 & 53 |
| Abwood Machine Tools Ltd. | 9 |
| Acbars Ltd. | 118, 136 & 166 |
| Aircraft Unit Eng'g. Co. | 154 |
| Ajax Machine Tool Co. Ltd. | 64 & 65 |
| Alexander Bros. | 180 |
| Alleyne Foster Eng'g. Co. Ltd. | 152 |
| Almco Supersheen Division of G.B. Ltd. | 33 |
| Archdale, James & Co. Ltd. | 80 |
| Ashtead Eng'g. Co. Ltd. | 152 |
| Atkin, W. T. (Tottenham) Ltd. | 156 |
| Auto Screw Products Ltd. | 152 |
| Automation Limited | 35 |
| Automotive Eng'g. Ltd. | 131 |
| Avenue Eng'g. Co., The | 152 |
| Aylesbury Turned Parts (True Screws) Ltd. | 154 |
| Baker, John & Sons Ltd. | 138 |
| Balfour, Arthur & Co. Ltd. | 7 |
| Barber & Colman Ltd. | *Inside Back Cover* |
| Bell, H. (Machine Tools) Ltd. | 162, 169 & 178 |
| Bellows-Valvair Ltd. | 104 |
| Benton Eng'g. Co. Ltd., The | 126 & 152 |
| Boneham & Turner Ltd. | 106 |
| Bosch Ltd. | 30 |
| Brasshouse, Peter Ltd. | 120 |
| Bristol Street Motors Ltd. | 178 |
| British Oxygen Co. Ltd. | 61 |
| Brockhouse, J. & Co. Ltd. | 108 |
| Brook Motors Ltd. | 129 |
| Brookman, R. S. Ltd. | 42 |
| Broom & Wade Ltd. | 107 |
| Brown Bros. (Metals) Ltd. | 124 |
| Brown, David Corporation (Sales) Ltd., The | 82 |
| Brown's Eng'g. Works | 155 |
| B.S.A. Tools Ltd. | 60 |
| Buck & Hickman Ltd. | 17 |
| Buck & Ryan Ltd. | 146 |
| Bullows, Alfred & Sons Ltd. | 119 |
| Burdett, G. W. S. & Co. Ltd. | 117 |
| Burnerd, F. & Co. Ltd. | *Back Cover* |
| Burton, Griffiths & Co. Ltd. | 60 |
| Butcher, Henry & Co. | 161 |
| Butterworth British Automatic Machine Tool Co. Ltd. | 105 |
| B.X. Plastics Ltd. | 26 |
| Calorizing Corporation of Great Britain Ltd., The | 122 |
| Carne, Rudolph & Co. Ltd. | 32 |
| Cashmore, John Ltd. | 175 |
| Catmur Machine Tool Corporation Ltd. | 116 |
| Cattermole, H. S. & Co. (Hydraulics) Ltd. | 83 |
| Centaur Tool Works | 166, 169 & 174 |
| Centec Machine Tools Ltd. | 10 |
| Chatwin, Thomas & Co. | 139 |
| Ching, Richard & Son Ltd. | 157 |
| Cincinnati Shaper Co. Ltd., The | 87 |
| Clifton & Baird Ltd. | 142 |
| Cooper & Co. (Birmingham) Ltd. | 126 |
| Coventry Grinders Ltd. | 151 |
| Crompton Parkinson Ltd. | 18 & 19 |
| Cross Manufacturing Co. (1938) Ltd. | 138 |
| Croydon Tool & Case Hardening Specialists Ltd. | 150 |
| Davis, Stuart Ltd. | 3 |
| Delancey Tool & Eng'g. Works Ltd. | 153 |
| De Roll, Iron Works Ltd. | 48 |
| Desoutter Bros. Ltd. | 127 |
| Dewrance & Co. Ltd. | 49 |
| Dimco (Gt. Britain) Ltd. | 175 |
| Donovan Electrical Co. Ltd., The | 157 |
| Dorman Long (Steel) Ltd. | 124 |
| Dormer Machinery Sales Ltd. | 143 |
| Douglas, A. Co. Ltd. | 159 & 170 |
| Dowding & Doll Ltd. | 41, 100 & 106 |
| Dowling, David Ltd. | 136 & 146 |
| Drawing Office Equipment & Materials Exhibition | 114 |
| Drummond-Asquith Ltd. | 11, 62, 63 & 96 |
| Duplex Electric Tools Ltd. | 143 |
| Eagle Milling Co. Ltd. | 149 |
| Eclipse Foundry & Eng'g. Co. (Dudley) Ltd. | 151 |
| Economic Stampings Ltd. | 155 |
| Edmonton Tool & Eng'g. Co. Ltd. | 156 |
| Edwards, Albert (Machinery) Ltd. | 159 & 166 |
| Edwards Bros. | 153 |
| Edwards, F. J. Ltd. | 23, 159, 161, 169, 174 & 176 |
| Elgar Machine Tool Co. Ltd. | 21, 103, 144 & 162 |
| Elliott, B. (Machinery) Ltd. | 45 & 165 |
| Evans, Fredk. W. Ltd. | 152 |
| Eyre Smelting Co. Ltd., The | 137 |
| Fenner, J. H. & Co. Ltd. | 6 |
| Fenter Machine Tools Ltd. | 68 |
| Fletcher Miller Ltd. | 66 |
| Flexicon Ltd. | 147 |
| Forrest, W. & Co. Ltd | 165 |
| Forst Brosch Co. (G.B.) Ltd. | 20 |
| Frank, Charles Ltd. | 134 |
| Frye Machine Tool Co. Ltd. | 160 & 176 |
| Fuller, Horsey Sons & Cassell | 146 |


(Continued on page 182)

## INDEX TO ADVERTISERS—*(continued from page 181)*


PAGE

Gair Machine Tools Ltd. ..... 172
Gate Machinery Co. Ltd. ..... 110 & 168
Gear Grinding Co. Ltd., The ..... 15
General Engrs. Supply Co. (1937) Ltd., The 157
Gidley (Machinery) Ltd. ..... 161
Goulder, J. & Sons Ltd. ..... 12
Graepel, H. Ltd. ..... 157
Granby, Paul & Co. Ltd. ..... 22
Gray, R. O. ..... 171
Griffiths, Gilbert, Lloyd & Co. Ltd. ..... 145
Grimston Electric Tools Ltd. ..... 144
G.R.M. Heat Treatments Ltd. ..... 151
Grosvenor Works (Holloway) Ltd. ..... 156

Habit Diamond Tooling Ltd. ..... 43
Hahn & Kolb (Great Britain) Ltd. ..... 4
Hallamshire Steel Co. Ltd. The ..... 139
Hammond Eng'g. Co. Ltd., The ..... 157
Harbots Ltd. ..... 148
Hardy & Hanson Ltd. ..... 100
Harper, John & Co. Ltd. ..... 5
Harvey, G. A. & Co. (London) Ltd. ..... 51
Harvey-Hood Eng'g. Co. Ltd. ..... 150
Heap, Joshua & Co. Ltd. ..... 97
Heliot ..... 166 & 172
Hepworth Iron Co. (Eng.) Ltd., The ..... 13
Herbert, Alfred Ltd. ..... 25 & 27
High Frequency Heat Treatment ..... 150
High Speed Service Tool Co. Ltd. ..... 151
Highbury Metal Spinning Co. (1955) Ltd. 155
Holly Eng'g. (Drayton) Ltd. ..... 156
Holmes, Percy (Engrs.) Ltd. ..... 158
Humphreys, J. H. & Sons Ltd. ..... 132
Hunt, Herbert & Sons Ltd. ..... 137
Huntley & Sparks Ltd. ..... 152
Hurlock, Wm. Jnr. Ltd. ..... 164

Ide, C. F. Eng'g. Ltd. ..... 148
Ideal Hardening Co. Ltd. ..... 151
Imperial Chemical Industries Ltd. ..... 47
Impregnated Diamond Products Ltd. ..... 101
Ina Needle Bearings Ltd. ..... 102
Indusmond (Diamond Tools) Ltd. ..... 78
Industrial & Commercial Finance Corp. Ltd. 145
Industrial Trading Co. Ltd. ..... 157

J.B. Machine Tool Co. Ltd. ..... 160 & 162
Johansson, C. E. Ltd. ..... 70
Jones, A. A. & Shipman Ltd. ..... 99 & 141
Jones, E. H. (Machine Tools) Ltd. ..... 159 & 166

Kavanagh O'Moore & Co. Ltd. ..... 44
Kayser, Ellison & Co. Ltd. ..... 84
Kearney & Trecker-C.V.A. Ltd. ..... 109
Keir, Alan Ltd. ..... 151
Kemp Precision Tooling Ltd. ..... 156
Kemworthy Jig & Press Tool Co. Ltd. ..... 155
K.E.N.T. Machinery & Eng'g. Co. ..... 165
Kimbell Machine Tools Ltd. ..... 92 & 93
Kirk, Harry Eng'g. Ltd. ..... 175
Kitchen, A.—D. Walker Ltd. ..... 128
Klingelnberg, W. Ferd Sohne ..... 29

Landen (Engineers) Ltd. ..... 149
Lang, John & Sons Ltd. ..... 52
Lattimer, E. R. Ltd. ..... 154
Lawrence, A. & Co. (Machine Tools) Ltd. 159 & 172
Layton, M. C. Ltd. ..... 160
Lees, Hall & Son Ltd. ..... 180
Lench, Thos. Wm. Ltd. ..... 116

PAGE

Lenchs (Birmingham) Ltd. ..... 140
Lethaby, Wm. & Co. Ltd. ..... 98
Leyton Eng'g. Co. Ltd. ..... 153
Leytonstone Jig & Tool Co. Ltd. *Inside Front Cover*
Liberty Eng'g. Supplies Ltd. ..... 164

MacDowall Equipment Co. Ltd. ..... 156
MacEchern & Co. Ltd. ..... 149
Machinery Publishing Co. Ltd., The ..... 176
Machine Shop Equipment Ltd. ..... 110
Marbaix, Gaston E. Ltd. ..... 77
Markland Scowcroft Ltd. ..... 16
Marley, W. H. & Co. Ltd. ..... 130
Marsden & Shiers Ltd. ..... 152
Marsden, W. G. Eng'g. Ltd. ..... 153
Martin Bros. (Machinery) Ltd. ..... 172
Martonair Ltd. ..... 76
Maun Industries Ltd. ..... 148
Maysmith Eng'g. Co. Ltd. ..... 156
Meddings, W. J. Ltd. ..... 67 & 79
Mek-Elek Eng'g. Ltd. ..... 140
Melbourne Eng'g. Co. Ltd. ..... 112
Mercantile Credit Co. Ltd. ..... 75
Midland Machine Tool Co., The ..... 168
Millen, Edwin & Sons Ltd. ..... 159 & 161
Miller, J. W. & Son Ltd. ..... 54
Mills, George (Engineers) Ltd. ..... 151
Milnes, Henry Ltd. ..... 14
Modern Machine Tools Ltd. ..... 163
Monks & Crane Ltd. ..... 138
Mortimer Eng'g. Co. Ltd. ..... 148
Mortimer Machine Tool Co. Ltd. ..... 31
Moser Cams & Tools Ltd. ..... 136
Motor Gear & Eng'g. Co. Ltd. ..... 142
Murray's (Pretoria) Eng'g. Co. Ltd. ..... 130

Naish Bros. & Co. Ltd. ..... 155
Neill, James & Co. (Sheffield) Ltd. ..... 91 & 97
Nettlefold & Moser Ltd. ..... 28
Newall Used Machine Division ..... 162
Newman Industries Ltd. ..... 159 & 170
Nickols Automatics Ltd. ..... 104
Nielsen, F. C. & Son ..... 157
North British Rubber Co. Ltd., The ..... 133
Norton, W. E. (Machine Tools) Ltd. ..... 167
Novogage Ltd. ..... 150

Oakey, John & Sons Ltd. ..... 69
O.K. Trading (B'ham Factors) Ltd. ..... 158
Osborn, Samuel & Co. Ltd. ..... 86

Parkin, F. M. (Sheffield) Ltd. ..... 82
Parkinson, J. & Son (Shipley) Ltd. ..... 53
Pidgen Bros. Ltd. ..... 98 & 174
Pilot Works T'd. ..... 90
Pinder, W. & Son Ltd. ..... 130
Polarcold Ltd. ..... 155
Pollard, Fredk. & Co. Ltd. ..... 135
Precision Grinding Ltd. ..... 55
Precision Heating Ltd. ..... 150
Precision Products (Romford) Ltd. ..... 149
Price Machine Guards Ltd. ..... 140

Raistrick, J. E. Ltd. ..... 160
Rawlplug Co. Ltd., The .. *Inside Back Cover*
Rayner, Peter Ltd. ..... 144
Redcar Eng'g. Co. Ltd. ..... 154
Renault Machine Tools (U.K.) Ltd. ..... 121
Revolving Centres Ltd. ..... 126
R.J.H. Tool & Equipment Co. Ltd., The .. 132
Rockwell Machine Tool Co. Ltd. 37, 38, 39, 40 & 148

PAGE

Rodgers Bros. Ltd. ..... 148
Rollo Industries Ltd. ..... 108
Roth, L. ..... 162
Rowland, F. E. & Co. Ltd. ..... 2
Rubert & Co. Ltd. ..... 134
Rye, Claude Bearings ..... 157 & 158

Sales Enterprise Ltd. ..... 176
Sanderson Bros. & Newbould Ltd. ..... 46
Saunderson & Costin Ltd. ..... 36
Schrader's Son, A. ..... 81
Scottish Machine Tool Corp. Ltd. ..... 113
Selson Machine Tool Co. Ltd., The ..... 161
Seton Creaghe Eng'g. Ltd. ..... 150, 151 & 154
Shand, J. H. Ltd. ..... 128
Shardlow Micrometers Ltd. ..... 122
Sheet Metal Machinery Co. Ltd. ..... 173
Sheffield Twist Drill & Steel Co. Ltd., The 95
Shell-Mex Ltd. ..... 58 & 59
Shelmerdine & Mulley Ltd. ..... 154
Simmonds Aerocessories Ltd. ..... 24
Skefko Ball Bearing Co. Ltd., The *Front Cover*
Slingsby, Walter & Co. Ltd. ..... 157
Smart & Brown (Machine Tools) Ltd. ..... 111
Smiths Industrial Instrument Division .... 123
Smith & Netherwood Ltd. ..... 154
Soag Machine Tools Ltd. ..... 173
Southern Eng'g. & Machinery Co. Ltd. ..... 160
Spectra Chemicals Ltd. ..... 94
Speed Tools Ltd. ..... *Inside Front Cover*
Spring Steel Productions Ltd. ..... 120
Stancroft Ltd. ..... 159, 164 & 168
Standard Piston Ring & Eng'g. Co. Ltd. .. 118
Stephens, R. & Son Ltd. ..... 155
Stevens & Bullivant Ltd. ..... 147
Sykes Machine Tool Co. Ltd. ..... 50

Tate Machine Tool Co. Ltd. 161, 164, 165 & 177
Taylor, Taylor & Hobson ..... 102
Tecalemit Ltd. ..... 74
Thoka Machinery Supplies Ltd. ..... 34
Thompson, Joseph (Sheffield) Ltd. ..... 132
Thompson, Michael S. Ltd. ..... 182
The Times Machinery Ltd. ..... 141 & 165
Trevena & Glover Ltd. ..... 155
Try, Gordon Ltd. ..... 56
Turner Bros. Asbestos Co. Ltd. ..... 134

Universal Eng'g. Co. Ltd. ..... 158

Vaughan Associates Ltd. ..... 125
Victa Eng'g. Co. ..... 114
Visual Planning Systems Ltd. ..... 128

Ward, M. (Machine Tools) Ltd. .. 160 & 164
Ward, Thos. W. Ltd. ..... 115 & 170
Webb, R. ..... 180
West Green Tool Co. ..... 156
Westool Ltd. ..... 88 & 89
Wickman Ltd. ..... 57
Widdowson, Herbert & Sons Ltd. 71, 72, 73 & 163
Wigglesworth, Frank & Co. Ltd. ..... 147
Wild-Barfield Electric Furnaces Ltd. ..... 1
Williams, H. & Son Ltd. ..... 181
Windley Bros. Ltd. ..... 8
W.J.L. (Machinery) Ltd. ..... 157
Worson Die Cushions Ltd. ..... 142

Young, John S. & Co. Ltd. ..... 112

Zephyr Cams Ltd. ..... 153



*Write to Thompson's for details of :—*

**THE WORLD'S FINEST *KEYLESS* DRILL CHUCKS**

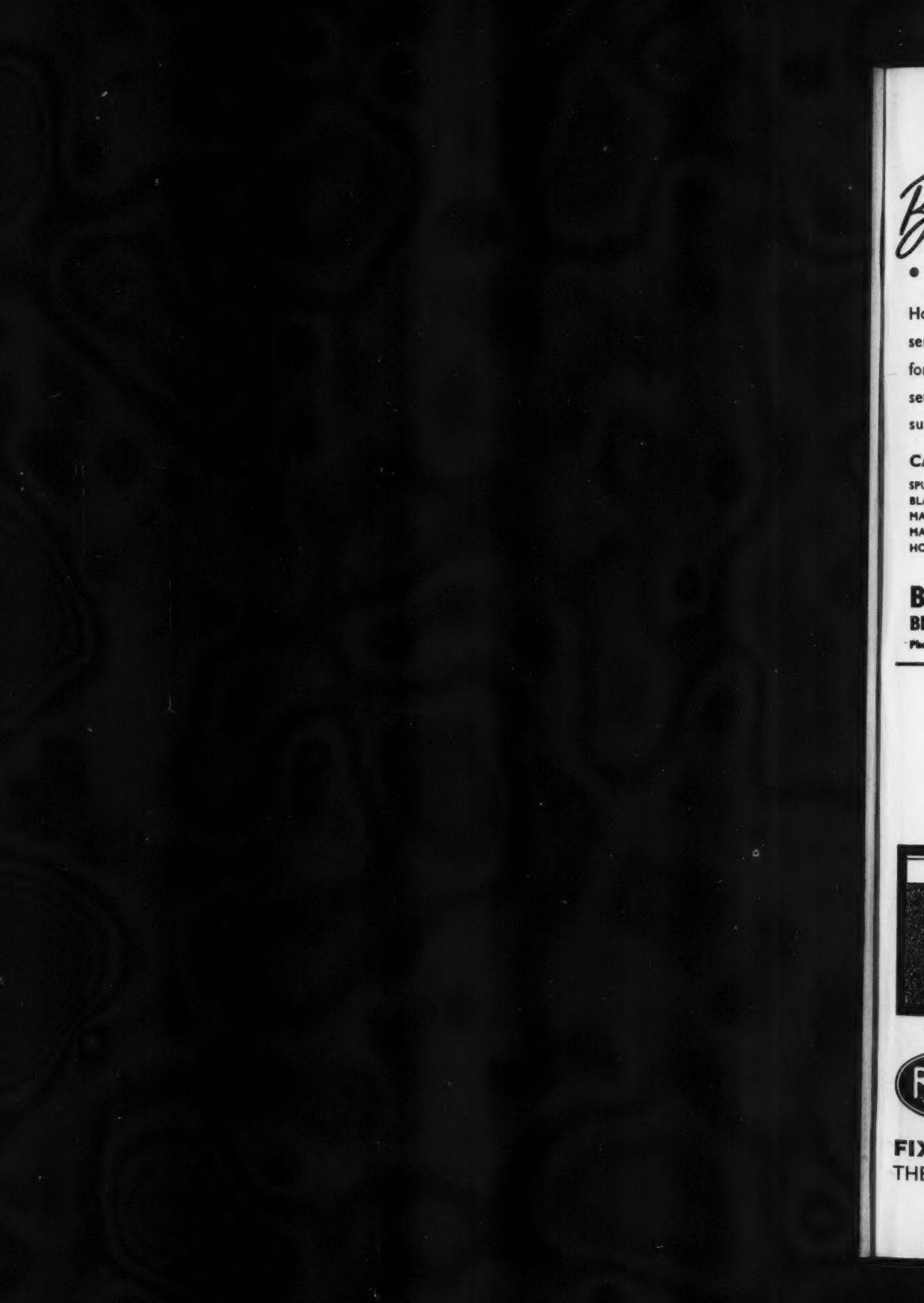
**SUPRA** GENERAL PURPOSE — **ROHM** — **SPIRO** HIGH PRECISION

*Sole Importers—* **MICHAEL S. THOMPSON LIMITED**

185-187 HAMMERSMITH ROAD, LONDON, W.6. RIVERSIDE 7922-3. GRAMS: TOMTOOL, LONDON, W.6.

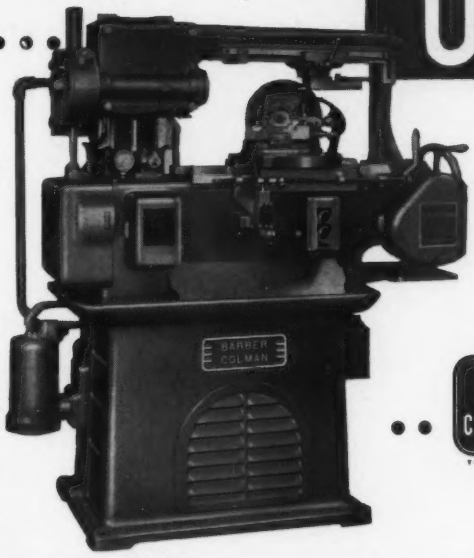
1961


PAGE
148
108
162
2
134
158
176
46
36
81
113
161
154
128
122
173
95
59
154
24
Cover
157
111
123
154
173
160
94
Cover
120
168
118
155
147
50
177
102
74
34
132
182
165
155
56
134
158
125
114
128
164
170
180
156
89
57
163
147
1
181
8
157
142
112
153



*British Built* **BARBER-COLMAN HOBBER No. 6-10**

Hobs, spurs, helicals, splines, serrations and special forms of 12 D.P. and finer. Ease of set-up makes the 6-10 suitable for long or short runs.




**CAPACITY:**

| | |
|---|---|
| SPUR AND HELICAL | 12 DP AND FINER |
| BLANK DIAMETER | UP TO 6in. |
| MAX. TRAVEL OF HOB SLIDE | 10½in. |
| MAX. SWIVEL ANGLE SETTING | 60°R, 90°L |
| HOB SPEEDS (STANDARD) | 133/533 R.P.M. |

COLMAN
TRADE MARK

**BARBER & COLMAN LTD**
**BROOKLANDS, Sale, Cheshire.**
Phone: Sale 2277 Grams & Cables: 'Barcol Sale'

*Cut your costs with*

**24 RAWLPLUG FIXING DEVICES**
**FOR SPEEDY FIXING IN ANY MATERIAL**

No more trouble or costly delay because the material was 'difficult'! Whether it's concrete or plastic, breeze or sheet metal, cavity brick or lath and plaster, there's a Rawlplug Fixing Device that makes firm screw or bolt fixings quickly, easily and economically. The speedy answer to *every* fixing problem is one or other of the 24 different types of Rawlplug Fixing Devices.

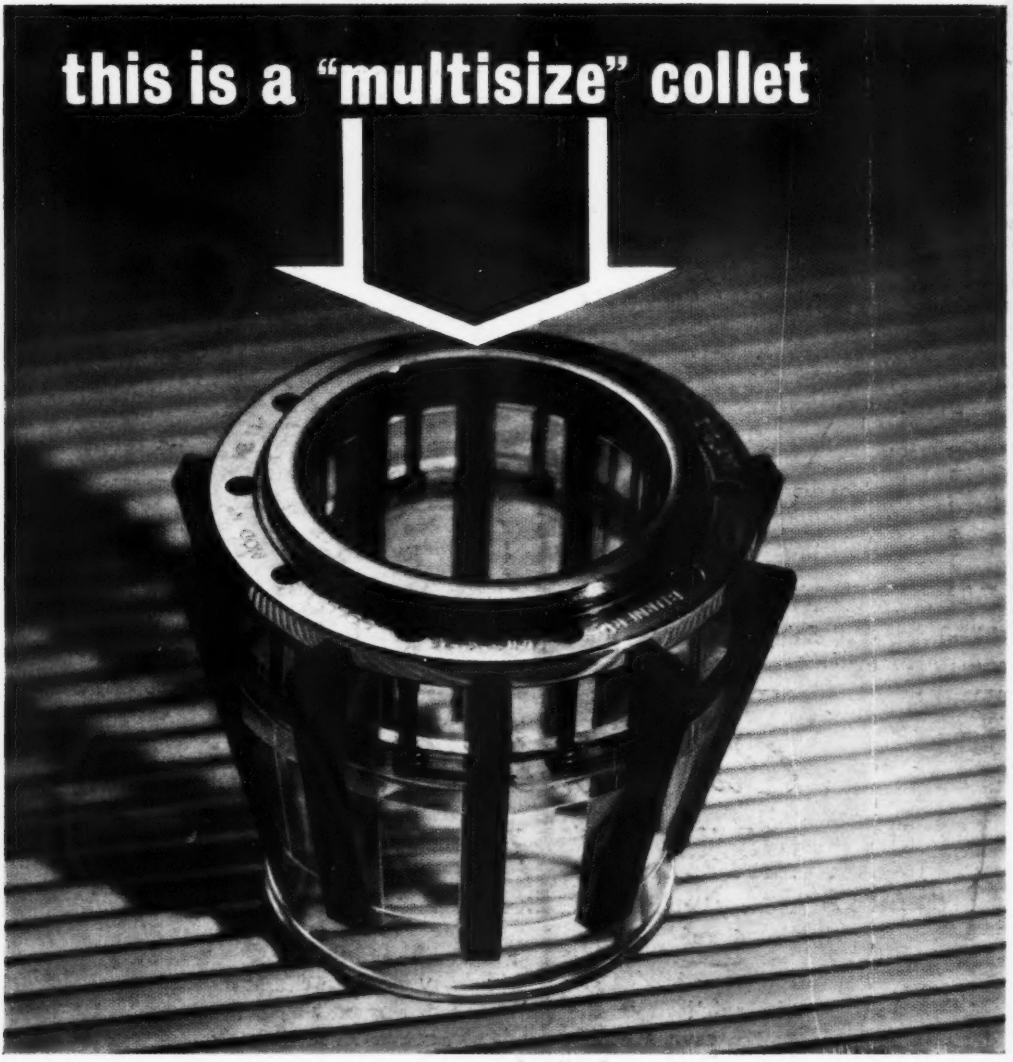
RAWLPLUG

**USED BY THE MILLION THROUGHOUT INDUSTRY**

Write for illustrated brochure.

**FIXING DEVICES**
THE RAWLPLUG COMPANY LTD · CROMWELL ROAD · LONDON · S.W.7

# this is a "multisize" collet



It has a stepless gripping range of 1/8", equivalent to the gripping capacity of at least ten spring collets. Sizes are available covering a total range from 1/16" to 2½". It is the heart of the "multisize" collet system of workholding and toolholding.
All "multisize" collets in any type range are interchangeable.

*to find out more about "multisize" write or phone:—*

**F. BURNERD & CO. LTD. MOORSIDE WORKS, WINCHESTER, ENGLAND.**
*Telephone Winchester 5195* *London Office : 5, Balfour Place, London, W.1.*


Published by THE MACHINERY PUBLISHING CO., LTD., at their Office, Clifton House, 83-117, Euston Rd., London, N.W.1. Telephone Euston 8441.
LONDON: HARRISON & SONS, LTD., by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx.) and High Wycombe.